MAY 25, 1923

THE RUBBER AGE

VOL. XIII. NO. 4

Copyright, 1923, by The Gardner, Moffat Co. Inc.

TABLE OF CONTENTS

NEWS SECTION

Firestone Resigns From Rubber Association 129
Prominent Men in New Akron Concern 130
Lee Takes Over Republic Plant 131
Activities of French Rubber Association 132
Filipinos May Alter Laws 133

FEATURE SECTION

Disk Spray Process in Operation 137
Evidences of Increased Use of Latex 139
What Is Future of Latex? 142
Building Tires on Flat Steel Drum 143
Development of Rubber Insulators 145
Artificially Rigged Rubber Market 147
Colloid Chemistry of Rubber 149
What About the Rubber Tiling Market 151
Abstracts 154

MARKET AND STATISTICAL

Cottons and Fabrics 156
Chemicals 157, 158
Crude, Reclaimed and Scrap Rubber 158
Patents, Trade Marks, New Incorporations 159
Statistics 160

PUBLISHED ON THE 10th AND 25th OF EACH MONTH BY

THE GARDNER, MOFFAT COMPANY, Inc.

ADDRESS ALL CORRESPONDENCE TO BUSINESS AND EDITORIAL ROOMS: 225 FOURTH AVENUE, NEW YORK

Telephone: Stuyvesant 4552

PUBLICATION OFFICE: HIGHLAND, N. Y.

Published Semi-Monthly by the Gardner, Moffat, Co., Inc., Highland, N. Y., and 225 Fourth Ave., N. Y. City.
Entered as Second Class Matter June 10, 1920, at the Post Office at Highland, N. Y., under the Act of March 3, 1879.

Advertising Forms Close Ten Days Before Date of Publication. Rates for Advertising Will Be Furnished on Application.
Subscription Price: $2.00 per Annum. Single Copies 10 Cents. Canada, $2.50 per Annum. Foreign, $3.00 per Annum.

F. R. HENDERSON & CO., Inc.

CRUDE RUBBER

111 BROADWAY, NEW YORK

CABLE ADDRESS
"REDSONDER, NEW YORK"

LIEBER'S
A. B. C. 5th EDITION and
PRIVATE CODES

LONDON
HENDERSON, FORBES & CO., Ltd.

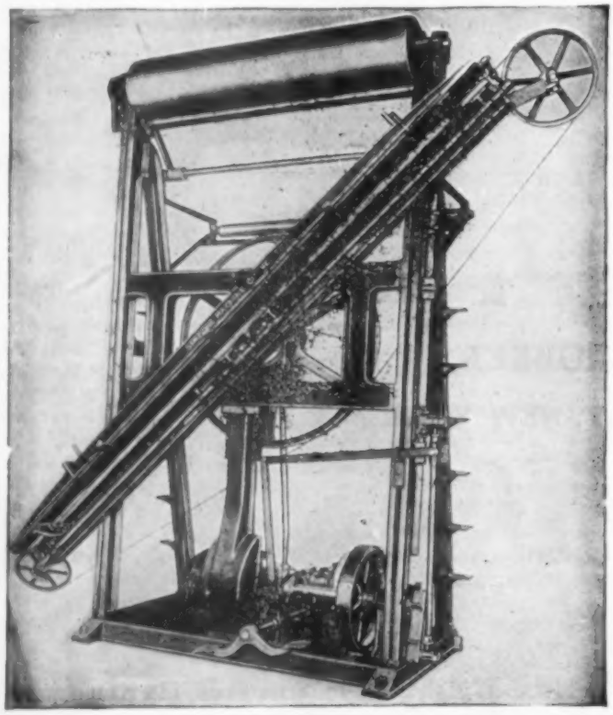
SINGAPORE
HENDERSON BROS., LIMITED

BATAVIA
HENDERSON BROS., LIMITED

"A Guaranteed Rubber Latex"

F. R. HENDERSON & CO., INC.
MALATEX
New York City

The natural liquid product with a guaranteed minimum of 30% dry rubber. Preserved with ammonia, an effective and harmless anti-coagulant.



Front View at 45 Degrees Pat. No. 942164.
Francis Shaw & Co., Ltd., Manchester, England, Manufacturers and Selling Agents for Continental Europe, Great Britain and British Colonies, excepting Canada

THE
Bolton Vertical Bias Cutter

SINGLE LINING STRIPPER
DOUBLE LINING STRIPPER
WIND-UP MACHINE

The most economical, accurate and efficient equipment for the cutting of fabrics on the bias.

The wind-up machine is our latest development, taking care of the stock after it has been cut on the Bolton Vertical Bias Cutter—but is suitable for any type of bias cutting machine.

SPADONE MACHINE CO., Inc.
15 Park Row, New York City

THE RUBBER AGE

The Only Twice-a-Month Rubber Publication

VOL. XIII. MAY 25, 1923 No. 4

LARGE EXPORTS DUE TO STOCK AND SMUGGLING

Large Shipments of Rubber Due to Smuggling and to Stocks Held Before Restriction Act—Action to Limit Transfer of Coupons—Activity of Rubber Association.

NEW YORK, May 16, 1923. — The Special Committee of the Rubber Association on Crude Rubber Restriction has issued a statement on restriction in which it states that the large shipments of crude rubber during April and the first two weeks in May is due largely to the large stocks of rubber on hand before restriction went into effect and also to the smuggling and leakage through other sources.

The transfer of coupons is now prohibited unless a bona fide sale is shown, thus tending to overcome this evil. A new ruling has also been made on the amount of rubber held by any dealer in the East.

The Committee further states its position against restriction and urges the co-operation of the industry. The statement follows:

The Special Committee in charge of Crude Rubber Restriction, has been authoritatively advised that the reported heavy shipments of rubber from the East are largely due to stocks accumulated before the introduction of the Stevenson Plan and that strong measures are and will be taken by the British and Colonial Governments to put a stop to smuggling and leakage through other sources. Also that there is no present intention of modifying the regulation plan.

On April 30th the Federated Malay States Government adopted a new rule under the Rubber Act regulating exports of rubber from British Colonies which prohibits the transfer of licenses or coupons except on proof of the bona fide sale of rubber covered thereby. In addition to this, licensed dealers in the East are now forbidden to possess any rubber in excess of the quantity for which coupons or export licenses are held. Any excess rubber held at May 1st must be reported to the Government and cannot be disposed of without written permission.

It appears evident that, despite the strong representations of the Rubber Association of America, Inc., and of certain British manufacturers, the British Colonial Office adheres to the belief that restriction is still necessary to stabilize prices at a level sufficiently high to enable the average plantation to earn a reasonable return upon the investment and to encourage new planting and insure future supplies.

The recent trend of prices would appear to lend color to the Rubber Growers' Association's assertion that there is an abundance of rubber to meet immediate requirements. It is by no means certain, however, that this will be the case in six months' time, if American consumption continues as during the early part of 1923.

In speaking at the annual dinner of the Rubber Growers' Association, held in London on April 17th, Sir James Stevenson said that if the committee's calculations as to the amount of rubber required were wrong, it would not be necessary to repeal the legislation in order to deal with such a situation should it occur. This is further evidence that no immediate repeal is contemplated but, taken in conjunction with personal assurances received from authentic sources, it is believed to indicate that any shortage that may occur will be met by the immediate introduction of further elasticity into the scheme, without reference to the stipulated quarterly periods for revision.

The British Embassy in Washington has also advised the Rubber Association of America, Inc., that "the Secretary of State for the Colonies has undertaken to give careful consideration to any evidence which the Rubber Association of America may desire to put forward tending to show the inadequacy of the present scheme to meet the situation in the rub-

(Continued on next page)

THIS ISSUE —

Every page of this issue of THE RUBBER AGE is printed on Rubber Latex Paper. This is the first commercial use of rubber latex paper for the complete issue of any trade paper or magazine in the United States.

FIRESTONE RENOUNCES RUBBER ASSOCIATION

Firestone Company Resigns from Rubber Association—Result of Continual Opposition to Firestone's Activity on Rubber Restriction, Statement Claims.

NEW YORK, May 21—The first open break between The Firestone Tire and Rubber Company and the Rubber Association has taken place. Firestone has resigned from the Rubber Association in a letter dated May 17 addressed to Mr. Viles, General Manager.

The reasons for the resignation, as given in a statement issued by the company are as follows: The failure of the Rubber Association to cope with the 'crisis' created by the rubber restriction act; the opposition of the Association to the company's activity in protesting to the British Government on the rubber restriction act; the failure of the Rubber Association Committee to accomplish anything in the conferences with the British R.G.A. Committee; the appropriation of $5,000 as a fund to obtain publicity and 'quiet any misapprehension' that existed as to the Associations viewpoint on the restriction laws.

The Board of Directors of the Rubber Association will take the next step and determine its future course of action. Mr. Viles had no statement to make on the matter.

A copy of the letter of resignation, signed by H. S. Firestone, follows:

"In behalf of The Firestone Tire & Rubber Company I hereby tender, for the attention of your Board of Directors, its resignation as a member of The Rubber Association of America. This action is taken only after mature consideration and with the greatest reluctance. The failure of your organization to cope with the major problems of the Association, especially the crisis created by the Rubber Restriction Act, has impelled this action.

"In the beginning this company called your attention to the laws and has ever since urged you to action. You appointed a committee to confer with the rubber growers. We protested that this would be a waste of time. Months have elapsed—the rubber growers have reported urging more strict enforcement of

(Continued on next page)

INCREASED PRODUCTION ALLOWED TO GROWERS

Flat Production Rate of 320 Pounds Increased to 426 Pounds on February 1, 1923—Will Increase Malayian Production by about 16,000 Tons

The Controller of Rubber Export for the Strait Settlements and the Federated Malay States, in his recently submitted report for the Federated Malay States relating to standard production under the restrictive scheme, shows the standard production of estates of 25 acres or less amounts to be 28 per cent of the total standard production of all estates.

Under the restriction scheme, the standard was to be based on the actual figures of production for the year ending October 31, 1920, with certain modifications based on the age of the planted areas. Many of the small holders of a few acres were unable to show any actual figures, as records had not been kept. Furthermore, many of the small holders are dependent for their living on their few acres of rubber trees. The restriction scheme was placed into operation within a period of about three weeks and the sudden restriction of their output by 40 per cent came as a blow to these small holders who did not understand the operation of the scheme. After consideration of the question, the Government fixed a flat rate of 320 lbs. per acre per annum as the standard production of holdings not exceeding 25 acres in extent. This figure represents the maximum allowance for any estate planted in 1915 or prior thereto for which figures of actual production during the year ending October 31, 1920, are not available.

On February 1, 1923, the flat rate of 320 lbs. per acre for small holdings was increased to 426 lbs. for the first five acres and 320 for the remainder of the holding not exceeding 25 acres in all. The Controller of Rubber Export estimates that the latest concession to the small holder will increase the standard production of the Federated Malay States by about 10,000 tons and of the Malay States not in the Federation by about 6,000 tons. At this rate the standard production in the Straits Settlements would be increased by about 2,200 tons. The concession to small holders thus increases the total standard production by about 18,200 tons which, under the present scale of 60 per cent. permits an additional yearly export of 10,920 tons.

PROMINENT MEN BEHIND NEW AKRON CONCERN

The Silica Rubber Co., 211 S. Broadway, Akron, O., has been organized for the manufacture of one-piece hard rubber battery containers and accessories. C. W. McLaughin, Director of the Mohawk Rubber Co., is president; Matthew Dettlebach, vice president; Dr. L. E. Sisler, treasurer and Homer L. Kinsley is secretary. Among those who will compose the board of directors are: J. G. Robertson, former treasurer of the Firestone Rubber Co., L. C. Rockhill, sales manager at Goodyear, E. Kelly, vice president National Steel Barrel Co. and W. W. Sharp, president of the Mill and Mine Supply Co.

FIRESTONE RENOUNCES RUBBER ASSOCIATION

(Continued from Page 129)

the laws. Nothing has been accomplished.

"Feeling this would be the result we have been doing everything in our power to bring about a protest to the British Government through the proper channels available. We have not had your co-operation. We have had only your continued opposition.

"Immediately after the failure of your negotiations with the rubber growers, the writer appeared before your Board and asked their co-operation with the work outlined by the Washington conference. You unanimously refused and circularized your membership to that effect. You withheld from your membership notice of the fact that at the same meeting in my absence, you were unanimously of the opinion that Secretary Hoover's suggestion of a rubber buying organization to combat the British monopoly of rubber production 'would be unwise and ineffective.' Nor did you advise your membership that at the same meeting you appropriated $5,000 of the association's funds to employ a publicity agency to use the trade papers and general press to 'quiet any misapprehension' that existed as to the Rubber Association's viewpoint on the restriction laws.

"The United States Government has recognized the problem as vital, affecting both our peace prosperity and war security and has appropriated a substantial fund for the investigation of a safe and adequate source of supply.

"This Company desires to do everything in its power to further this worthy project and to continue the agitation for the repeal of the British Laws. We have been aware of your opposition, even of your direct appeal to the membership to have nothing to do with our efforts, but when you employ the funds of the Association—a substantial portion of which this Company contributes—to actively oppose by systematic and organized publicity our efforts to secure the repeal of the laws and better conditions for the rubber industry and the consumers of rubber products, there apparently remains no choice.

"It is with great regret that the writer notifies you of this decision. Especially in view of the fact that he had the honor of being president of the Association during the reorganization period and has always had in mind the high purpose for the good of the industry and the American public it might serve."

TIRE AND RIM ASSOCIATION ISSUES 1922 ANNUAL REPORT

The Tire and Rim Association of America, formerly the Tire and Rim Association, has issued its annual report for 1922, in which a resume of the Association's history, as well as the names of firm members, by-laws and tire and rim standards are given. S. P. Thacher, president of the United States Rubber Co., was re-elected president of the Association; H. W. Kranz was re-elected treasurer, while W. B. Minch and George L. Lavery were chosen vice-president and secretary respectively.

In 1922 a corps of ninety inspectors were placed in rim plants throughout the country to insure production of standard rims. The inspectors approved 16,281,583 rims during the past year. During the first quarter of 1923 they passed 5,647,250 rims.

The following have been selected as directors for 1923: S. P. Thacher, J. E. Hale, Firestone Tire & Rubber Co., E. O. Fritch, The Hood Rubber Co., J. H. Wagonhorst, Hayes Wheel Co., W. J. Kirkpatrick, A. Schrader's Son, Inc., J. D. Anderson, The Fisk Rubber Co., B. Darrow, The Goodyear Tire & Rubber Co., Ford Lawrence, The Kelsey Wheel Co., H. W. Kranz, The Cleveland Welding & Mfg. Co., O. J. Rohde, Wire Wheel Corp. of America, W. P. Minch, Jaxon Steel Products Co., and P. Pleiss, Budd Wheel Co.

LARGE EXPORTS DUE TO STOCK AND SMUGGLING

(Continued from Page 129)

ber industry by providing for the exportation of rubber sufficient, with the available surplus in the world's stocks, to meet the estimated absorption while at the same time providing for a reasonable profit to the producing interests."

The Committee wishes, at this time, to emphasize the following points for consideration:

(1) That the American industry should be influenced primarily by a long view, realizing that, with or without restriction, prices must range considerably in excess of those prevailing during the economic depression of 1921 and 1922.

(2) That the Rubber Association of America, Inc., condemns restriction as an economic mistake, believing that, in view of consumption, prices will right themselves without Governmental interference.

(3) That from an economic standpoint it is to the selfish interest of British growers themselves to operate their plantations on a one hundred per cent basis just as soon as it can be demonstrated that the world's supply of rubber is not in excess of the demand. At the present time the British are operating in competition with the Dutch, who are unrestricted.

(4) That the investigation of rubber sources, present and future, by the United States Government has the hearty endorsement and cooperation of the Rubber Association of America, Inc.

(5) That, with a keen appreciation of the interests of rubber manufacturers, the automotive industry and the public, the Rubber Association of America, Inc., is doing its utmost to insure an adequate supply of rubber at reasonable prices, not only for present demands but for *future requirements.*

RUBBER HEADS ADDRESS FOREIGN COMMERCE GROUP

Harvey S. Firestone and F. A. Seiberling addressed the foreign commerce group of the Chamber of Commerce of the United States at a meeting held on May 9 at the Waldorf-Astoria, New York City. Mr. Firestone gave a resume of his fight against the Stevenson Law, and again declared that American rubber manufacturers should free themselves from the foreign grip "now held on the production of a commodity of vital importance to the public."

Mr. Seiberling concurred with Mr. Firestone on the point that the industry should "safeguard future supplies of crude rubber." He, however, said that he did not know of any crisis in the rubber industry such as Mr. Firestone referred to. Mr. Seiberling said that there was a crisis in the rubber industry in 1910 when prices of crude rubber mounted to $3 a pound.

Brunswick's Earnings

The Brunswick-Balke-Collender Co., Chicago, Ill., reports net earnings for the first quarter of 1923 of $631,631, against earnings for the same period in 1922 of 656,067. Net liabilities during the first quarter of 1923 were reduced $856,628.

The annual report to stockholders showed net income for the year ending December 31, 1922 of $2,585, 578. Surplus was $7,523, 947, while net liabilities in 1922 were reduced by $1,998,024. Dividends on the preferred and two classes of common stock during 1922 totalled $611,721. Current assets are listed at $23,169,612, against current liabilities of $8,808,612.

At the annual election of officers B. E. Bensinger was re-elected president; B. H. Brunswick, first vice-president, and J. C. Shank, treasurer. H. F. Davenport, formerly secretary, was elected second vice-president and P. L. Deutch, former assistant secretary, was chosen secretary. Harry W. Davis was added to the directorate, which consists of B. E. Bensinger, B. H. Brunswick, Julius Balke, C. P. Miller, H. F. Davenport, J. C. Shank and P. L. Deutch.

Firestone Branch Moves

The Firestone Tire & Rubber Co. is now in its new building at 63rd Street and West End Avenue, New York City. The new structure has 48,500 square feet of floor space, divided between four floors. All departments of the Firestone branch in New York City are now in one building, and better working arrangements are, therefore, in effect.

Blaze Damages Lincoln Plant

A fire that lasted for about two hours recently damaged the mixing room of Lincoln Rubber Co., Barberton, Ohio. Damage was estimated at $5,000.

India's Sales Increase

New accounts for the India Tire and Rubber Company, Akron, for the first four months of 1923 showed an increase of 30 per cent, while spring dating business totaled about $1,000,000. The company also states that they were asked to renew approximately $2,000,000 of April 10th acceptances. Unfilled orders on hand are said to be 40 per cent more than during 1922. The company's plants are operating at capacity.

Holden to Manufacture for Goodrich

The B. F. Goodrich Co. has recently completed arrangements with the Ames Holden Tire Co. of Canada, whereby the Canadian company will manufacture all of the requirements of the Goodrich company for the Canadian trade. The company will also handle some of Goodrich's export business.

Pioneer Gets Cameron Plant

The Pioneer Rubber Co., of Willard, Ohio, recently purchased a factory building formerly occupied by the Cameron Auto Co., and will use it as a branch plant for the manufacture of rubber novelties.

Wildman's Output Increases

New machinery is being installed by the Wildman Tire and Rubber Co., Port Clinton, Ohio, as a result of current demands for the company's products. Output is said to total about 350 tires a day, and when the new equipment is installed the company will have a capacity of 700 tires a day.

Pequannock's Plant Burned

The Pequannock Rubber Company's plant, opposite the Susquehanna station in Butler, N. J., was burned for the third time on May 6. The loss is estimated at $10,000.

Sure Foot Going Strong

The Sure Foot Heel and Rubber Company, Gettysburg, Pa., reports enough orders on hand to maintain capacity operations for many weeks. During the first ten days of May the company shipped between 90,000 and 100,000 pairs of rubber heels to dealers.

Phoenix Rubber Sued

Suit has been filed by the Ohio State Bank and Trust Co., which represents creditor's lien, against the Phoenix Rubber Co., Akron, Ohio. The bank seeks foreclosure of the mortgage on the company's property. The bank claims that $350,000 in bonds was issued to the company in January, 1921, and in June, 1922, the company was declared bankrupt by the United States District Court, and in December of that year the company offered a composition to its creditors providing for payment of all claims except the $350,000 mortgage given by the Ohio State Bank and Trust Co.

LEE TIRE PURCHASES REPUBLIC RUBBER CO.

Directors of Lee Tire & Rubber Approve New Stock Issue to Take over Bankrupt Republic Plant—New Ohio Organization to be Incorporated

NEW YORK, May 22—Announcement was made today that the Lee Tire and Rubber Company, headed by John J. Watson, Jr., had purchased the Republic Rubber Company, Youngstown, Ohio. Directors of Lee Tire have voted to increase the company's capital stock from 150,000 shares to 300,000 shares. Stockholders, however, will meet on June 6 to approve the directors recommendation.

Mr. Watson's announcement reads: "The sale of Republic marks the passing into new hands of one of the oldest rubber companies, whose products include pneumatic tires, truck tires, tubes and mechanical goods. Like many other rubber companies Republic in 1918 had large commitments for fabric and rubber which it was unable to liquidate in a declining market." Republic sales for March, 1923, were 52 per cent over February, 1923, and were the largest in any month in net sales since October, 1920.

Plans of the new interests provide for the organization of a new Ohio corporation, the stock of which will be owned by the Lee Tire and Rubber Company. Several years ago C. H. Booth of Youngstown was appointed receiver for the Republic's property. Mr. Booth reorganized the property and personnel of the company. The sale of the property was consummated between the bank and merchandise creditors and Mr. Watson, after the creditors' committees had offered the properties to the stockholders with a plan of reorganization which the stockholders were unable to accept.

It is understood that the new company will continue to manufacture the old Republic products, including Republic Grande Cord Tires with the Staggard Tread, Republic Solid Pneumatic Truck Tires and its other products including belting, hose, packing and heels.

Change in the Mexican Classification of Pneumatic Tires

A Mexican decree, effective April 13, changes the classification of pneumatic rubber tires and inner tubes so that the schedule now reads as follows, according to a cablegram received from Assistant Trade Commissioner MacKenzie, Mexico City, on April 16: Item 633-A, Pneumatic tires of rubber and inner tubes for the same "not specified," 2 pesos per gross kilo (formerly included all pneumatic rubber tires); and Item 633-E, Pneumatic tires of rubber when the net weight of each is between 4400 and 10,000 grams, and the net weight of the inner tubes is between 600 and 1500 grams, 1.50 pesos per gross kilo.

1922 ACTIVITIES OF FRENCH RUBBER ASSOCIATION

The Secretary of the (French) Syndicat Professionnel des Caoutchoue, Gutta-Percha, Tissus Elastiques, Toiles, Cirees, in presenting a resume of the activities of the Association during 1922 states the proposition placed before the French Chamber of Deputies by M. Outrey, deputy from French Indo-China, that an import duty of 2 francs per kilo be made applicable to crude rubber imported from foreign countries, has been vigorously opposed and that, as a result, the Tariff Commission of the Chamber of Deputies pronounced against the imposition of the duty. The Commission for the Colonies on the other hand, is in favor of the tax, but the Association "has every hope that the law will be rejected by the Chamber of Deputies."

One argument presented by the Association in its hearings was that adoption of the law "Would deal a fatal blow to exporters who already are maintaining their position abroad with difficulty." So far as the tire trade is concerned, the official statistics show that French exports in 1922, although slightly heavier than in 1921, constituted about a four per cent decreased percentage of the total world export tire trade. Exports of rubber footwear decreased from 4,533 metric tons in 1921 to 2,337 metric tons in 1922; belting, hose and washers, from 1,701 to 1,316 metric tons; and waterproofed clothing from 426 to 195 metric tons.

The Association also stated that passage of the law would sacrifice a prosperous industry engaging 500 million francs capital and paying 150 to 200 million francs annually in wages and salaries, in order to safeguard an investment of 30 to 35 million francs in plantations.

Opposition to American Tariff

In discussing foreign tariffs, the Secretary stated: "There is one point on which we have believed it necessary to present a formal protest: that is the clause contained in the draft of the new American customs tariff, by the terms of which the books of French manufacturers and merchants exporting merchandise to the United States must be submitted, in France, to an inspection and control exercised by American representatives designated by their Government. A letter on this subject has been sent to the Confederation Generale of French production which has asked for our counsel on this point."

The Association has recommended an increase amounting to 33⅓% in the customs tariff on rubber belting, hose, washers, etc., and has brought to the attention of the Minister of Finances an anomaly in the duties levied on rubber thread, and hard rubber sheets and rods, which are now subject to equal rates. "Rubber thread is scarcely manufactured in France and as it is a raw material for certain industries," no objection is offered to the present rate. "Hard rubber sheets and rods are manufactured locally in sufficient quantities to supply the domestic requirements, but the present duty enables importers to undersell to the detriment of the local industry."

In discussing the British crude rubber export restriction scheme it is pointed out that the success of the attempt to increase the market price "beyond reasonable limits" was favored by the increased consumption of rubber in the United States, France, Germany, and Japan.

Penn. R. R. Sues Firestone

The Pennsylvania Railroad Co. has filed a bill in the court of common pleas, Akron, against the Firestone Tire and Rubber Co. for collection of rubber charges on rubber shipped in April, 1920. The railroad avers that an agreement had been signed with Firestone whereby a rate of $2 should be paid to the railroad for each day that a freight car was left unloaded after the first day. Judgment for $1,163.90 is asked for such unpaid demurrage charges.

Crude Rubber Firm Organized

Gove and Weber, Inc., have announced their entrance into the crude rubber and allied gums commission merchant field. The officers of the new concern are Frederick G. Gove, president and treasurer, and Edward Weber, vice-president and secretary. Offices are located at 25 Beaver Street, New York City. For a number of years Mr. Gove was connected with Gove and French, and was recently the president of Gove and Company. Mr. Weber was formerly president of The Rubber and Guayule Agency, Inc.

International Buys Majestic

Announcement was recently made that the International Rubber Company of Anderson, Indiana, will operate the Majestic Tire and Rubber Company's plant also located in Anderson. A group of local men including officials of the International Rubber Company purchased the Majestic's property for a cash consideration of $135,000. The new plant started operation under the International's management on May 7.

Directors of the new company are: J. D. Wiggins, S. T. Davis, L. Lantz of the International Rubber Company, Parke G. Haynes and Otto J. Feucht of the Fetcher-American Bank of Indianapolis. Mr. Wiggins is president and Mr. Haynes is secretary of the new concern. The Majestic Tire and Rubber Company has been in the hands of a receiver for the past eight months.

O. H. Smith with Thermoid

The Thermoid Rubber Company, Trenton, N. J., has recently engaged O. H. Smith, who for the past two years has been Sales Manager of the Doss Rubber Co., Atlanta, Ga. The Thermoid Company plans to create a separate tire division. Mr. Smith will have charge of tire sales.

CHEMICAL INDUSTRIES PLAN NINTH NATIONAL EXPOSITION

A questionnaire has been sent out by the National Exposition of Chemical Industries to the companies which intend to have displays at the Chemical Exposition to be held at the Grand Central Palace during the week of September 17 to 22. Types of displays will be based on answers to this questionnaire.

The management of the exposition has been in touch for some time with approximately two hundred exhibitors, and all have been urged to co-operate in every possible way with the management.

The advisory committee has been expanded and includes the following members from sales and production departments of chemical and chemical equipment manufacturers: John W. Boyer of the Mathieson Alkalia Works; Dr. Charles L. Reese of E. I. Du Pont de Nemours & Co.; Percy D. Schenk of the Duriron Co.; W. E. Moore of the New Jersey Zinc Co.; T. C. Oliver of the Chemical Construction Co.; R. Gordon Walker of the Oliver Continuous Filter Co.; William Haynes of *Drug & Chemical Markets* and H. J. Schnell of the *Oil, Paint & Drug Reporter*.

Reliance Bulletin Out

The Reliance Rubber Co. of London has issued a spring bulletin catalogue, which not only includes listings of hose, improved crutch pad with pneumatic cushion, gloves and other rubber goods, but in addition contains a number of interesting articles that deal with rubberware. For example, a spring and summer line is the caption under which the qualities of seamless bottles are reviewed, while a cartoon depicts milady lifted above diners in a fashionable restaurant by Reliance balloons. The major portion of the bulletin contains addresses on subjects dealing with mechanical rubberware.

Schiller Joins India

J. P. Schiller has become the Southern California representative for the India Tire & Rubber Company, having headquarters in Los Angeles, Cal. For a number of years Mr. Schiller was the Sales and Service Representative of the Woods Motor Vehicle Company of Chicago. In 1915 he became affiliated with the B. F. Goodrich Rubber Co., leaving that organization in 1916 to become District Manager in Seattle for the Willard Storage Battery Co. In 1919 he organized the J. P. Schiller Company, distributors of automotive specialites, storage batteries, et cetera.

Truck Tires Go Up

Announcement has been made that the Goodyear Tire & Rubber Company has advanced prices on automobile truck solid tires 10 per cent and from 7 to 13 per cent on cushion truck tires. The company was reluctant to increase prices of truck tires when the passenger types were advanced. The advance, however, is similar to increases of other companies.

FILIPINOS WILL ALTER LAWS FOR NEW CAPITAL

Resident Commissioner States that Philippine Legislature Will Amend Labor Laws to Attract American Rubber Capital—To Co-operate with Firestone.

Pedro Guevara, recently elected Philippine resident commissioner to the United States, has announced that the Philippine Legislature is willing to consider amending land and labor laws in an endeavor to encourage the investment of American capital in our Pacific archipelago to develop rubber plantations there.

The local legislation, according to Section 10 of the Act of Congress of August 26, 1916, is empowered to legislate on all matters pertaining to immigration, subject of course to the approval of the President, while the Act of Congress of February 5, 1917, prohibits the bringing in of contract labor into the United States, its territories and possessions. The former act has been the subject of considerable discussion among rubber men, and should the Philippine legislature deem it advisable to amend that act somewhat, it is not at all improbable that a large number of American owned plantations will be developed in the State of Mindanao and Basilan Islands. The area of the State of Mindanao is about the same as the State of Indiana, but its population is less than half a million. Cheap labor, American rubber men assert, is a necessity for the development of rubber plantations there.

Mr. Guevara said in commenting upon the Firestone program: "We will cooperate in every possible friendly way with the interests backing the Firestone plan, and we would appreciate assistance in our aspirations with the Filipino people for their independence. We can, if our rubber industry is properly developed, supply the United States with every pound of rubber needed. We favor American capital to that of any other country. We do not consider American capital as foreign."

About 100,000 trees are being tapped today on Basilan Island, while there are approximately 200,000 Castilloa rubber trees growing wild in the State of Mindanao. Information coming from Washington intimates that the Philippine Government feels sure that the American survey will find the situation in Mindanao and other islands one that will prove attractive from practically every standpoint to American capital.

In a recent article published in THE RUBBER AGE and which discussed Labor conditions in the Philippines Mr. Villamin said: "If I don't misread the mind of the Legislature an immigration law with provisions to meet the objections raised against it would be placed on the statute books in due time." The Filipinos have a preference for Malayan and Chinese workmen.

FIRESTONE PLANTATION ?

A report is making the rounds stating that H. S. Firestone is behind a movement promoting the formation of a new company to operate rubber plantations in the Philippines in conjunction with a number of smaller tire manufacturers. No confirmation has been made of this reported move.

The Present World Cotton Situation

The Department of Commerce has now completed, through its domestic and foreign staff, working in cooperation with the Department of Agriculture, a World Cotton Survey for the eight months ending March 31, 1923. Similar summaries were published in Commerce Reports of May 8 and November 13, 1922, and February 12, 1923.

World's Supply and Distribution of Cotton

(478 pound bales)	*American Bales*	*All Kinds Bales*
Stocks, August 1, 1921	9,351,000	14,752,000
Production, Commercial Cotton, 1921 (1)	7,954,000	14,741,000
Total Supply 1921-22	17,305,000	29,493,000
Consumption, 1921-22	12,293,000	20,047,000
Stocks, July 31, 1922 (2)	5,123,000	9,536,000
Production, Commercial Cotton, 1922 (3)	9,937,000	17,755,000
Total Supply 1922-23	15,060,000	27,291,000
Consumption, 8 months ending April 1, 1923	9,021,000	15,281,000
Stocks, by deduction, April 1, 1923 (3)	6,039,000	12,010,000

(1) This represents actual crops except in China where the cotton that enters into household consumption is excluded from the total as being of little commercial interest, and in India where an allowance of 375,000 bales of 478 pounds net weight has been subtracted as of household consumption.

(2) Total compiled from stocks reported in different parts of the world. The apparent stocks as of July 31, 1922, arrived at by deducting the consumption from the total supply, were 5,012,000 bales of American and 9,446,000 bales of all kinds of cotton. For the items making up the total stocks reported on July 31, 1922, see COMMERCE REPORTS for November 13, 1922.

(3) Includes the "city crop" and cotton coming into the United States from Lower California which loses its identity and goes into consumption as American cotton.

Firestone Loses West

Wylie West, manager of the Atlanta branch for the Firestone Tire and Rubber Company, has resigned, and will enter business for himself. Mr. West has the honor of establishing the first Firestone branch in the South, and since 1910 has covered seven Southern states and Cuba for that company.

Diamond Sales Mounting

The Diamond Rubber Co., Akron, Ohio, has announced that sales during the first quarter of the current year are three times greater than sales during the same period in 1922. Better development of the sales organization is said to be the reason for the increase in Diamond sales. The new pneumatic truck tire has also given dealers a larger field to develop.

PRODUCTION SCHEDULES MAY BE MAINTAINED

The demand for men in rubber centers would indicate that there will be no slaking up in production, although at this time of the year it is customary for tire companies to curtail production somewhat. At present, it is said, dealers are carrying stocks for between 30 and 60 days, and that tire dealers will again start placing orders in the very near future.

Reports coming from Akron state that tire companies are increasing production. Overtime is the rule in all rubber plants, while additional skilled and unskilled labor is in demand there. Tire dealers, furthermore, are said not to be overstocked, as current reports from dealers state.

Some reports coming from Akron state that curtailment in tire production has not been greater than 10,000 tires a day, bringing the total daily output down to 100,000.

Cross-Rib Changed to Wingfoot

The Goodyear Tire and Rubber Co. has announced that a change in the trade name from Cross-Rib to Wingfoot in connection with the Goodyear tire with a cross-rib tread design, which has been on the market for about ten months. The reason given for the change is that the symbol "Wingfoot" is better known to the tire trade and public generally as a Goodyear product. The company also uses the name on a number of its other products including its rubber heels. The Wingfoot is a companion tire to the Goodyear All-Weather tread tire.

U. S. Rubber Leases Building

The Springfield, Mass., branch of the United States Rubber Company has leased a new building on Taylor Street, the building having a total floor space of 37,000 square feet. The structure cost $175,000.

Pioneer Increases Capital

The Pioneer Rubber Mills, Pittsburgh, Pa., has increased its capital stock from $1,000,000 to $2,000,000. The corporation also intends to amend its charter.

Goodrich Columbus Lease

The B. F. Goodrich Rubber Company has leased three additional storerooms at 65-69 E. Naghten Street, Columbus, Ohio, for its branch there.

RECENT IMPORT DUTIES LEVIED ON RUBBER GOODS

Siam

The import duties of Siam apply equally to the products of all countries. Rubber goods are not separately specified in the tariff, and are subject to the general rate of 3% ad valorem for "All articles not specified," levied on c.i.f. value port of entry. Import duties are payable in gold ticals ($.379) or its equivalent.

Persia

The rates of duty specified in the Persian Customs Tariff apply only to countries enjoying most-favored-nation treatment. Goods from other countries pay double the amounts specified, and 10% ad valorem on goods free of duty. The United States enjoys most-favored-nation treatment.

Duties are payable in silver krans (silver kran = $0.0871) or its equivalent. The batman is equal to 6.548 pounds avoirdupois. The basis of the ad valorem duties is c.i.f. value port of entry.

Item No.	Articles.	Rate of duty. Krans per batman
8	Rubber and gutta percha and manufacturers thereof:	
	(1) Crude	Free.
	(2) Prepared, in slabs, sheets or threads. (Net wt.)	3.00
	(3) Goloshes. (Net wt.)	5.00
	(4) All other manufactures, including tires, without valves or metal studs, for cycles or vehicles	12% ad valorem.
	Note: Footwear composed of rubber and any textile material, in which the textile material is the more valuable part, is classed as clothing.	
19	Clothing of all kinds	15% ad valorem.
ex28	Textile materials and manufactures:	
	(3) (a) V. Fabrics covered with rubber	10% ad valorem.
52	All other articles not otherwise specified	15% ad valorem.

Union of South Africa

Important tariff changes are incorporated in the South African Parliamenary Budget affecting boots, shoes, and tires, among a number of other articles, according to a cable from Trade Commissioner P. J. Stevenson. These increases are made in pursuance of a policy of protection to home industry, and are to be effective at once. The changes made in the duties referred to affecting rubber goods are shown in the table below:

	FORMER DUTY		NEW DUTY	
	General	British Preferential	General	British Preferential
(Ad val.)	20%	17%	22%	19%
**Boots and shoes*:*				
Minimum per pair:				
Men's	9d.			
Women's	6d.		No. minimum.	
Children's	3d.			
Tires (all)				
(Ad val.)	20%	17%		
		(Per pound)	(Per pound)	
Tires, pneumatic (new)**		1s. 10d.	1s. 7d.	
Tires, solid (new)		3d.	2d.	

NOTES: *—Including rubber boots and shoes. **—The wording of the cable as received leaves a doubt as to whether or not tubes are included under the same rate as tires.

The above item appeared on page 193 of "Commerce Reports" for April 16, 1923, and contains all the information available on the subject. Trade Commissioner Stevenson has submitted detailed information by mail which will be published at a later date in "Commerce Reports."

British Malaya

Straits Settlements

Rubber goods are admitted free of duty into the Straits Settlements.

Federated Malay States

Negri Sembilan, Pehang, Perak, and Selangor comprise the Federated Malay States. The import duties apply equally to the products of all countries. The monetary unit is the Straits Settlements gold dollar = $0.5668. Tires are dutiable as parts of automobiles at the rate of 10% ad valorem, assessed on c.i.f. value port of entry; all other rubber goods are admitted free of duty.

Non-Federated Malay States

Kedah, Kelantan, Perlis, Trengganu, and Johore comprise the Non-Federated Malay States. Rubber goods are admitted free of duty into the Non-Federated Malay States with the exception of the State of Kelantan.

Kelantan

Rubber goods are classified as "Articles not otherwise specified" and are subject to an import duty of 3% ad valorem, assessed on c.i.f. value port of entry—applied equally to the products of all countries. The monetary unit is the Straits Settlements gold dollar = $0.5668.

Mesopotamia

The import duties of Mesopotamia apply equally to products of all countries.

The ad valorem rates of duty are based on the wholesale market price at port of entry, less import duties and trade discount. The monetary unit is the rupee, equivalent to $0.4866 at par of exchange.

Articles	Rate of Duty (Ad valorem)
*All unmanufactured articles not otherwise specified	11%
**All manufactured articles not otherwise specified	15%
Pneumatic tires and tubes	20%

*Raw rubber is classed under this item.
**Rubber manufactures except pneumatic tires and tubes are included in this item.

NEW RUBBER WASHING DEVICE

A rubber vacuum cup that can be secured to the bottom of a basin, or to a back wall faucet has been invented by W. L. Finkhouse of Grand Rapids, Michigan. The apparatus consists of two pieces: A rubber suction cup and a specially designed brush clamped into the former. When pressed against a surface a vacuum is created which holds the apparatus in place. When not in use it may be detached, folded and carried in the pocket

Campbell With Falls Rubber

The Falls Rubber Company, Cuyahoga Falls, Ohio, announces that W. S. Campbell has been appointed Western Sales Manager. For a number of years Mr. Campbell was Sales and Advertising manager of the Miller Rubber Company, and is well known in the tire trade.

Seiberling's Profits Increase

For the first three months of 1923 the Seiberling Rubber Company, Akron, Ohio, showed net profits of $158,000, compared with net profits of $56,000 for the nine months (April through December) in 1922. The company's profits for February, 1923, equals total profits for the nine months in 1922.

Total sales for the first quarter of 1923 are $1,694,000. This compares with sales of $3,845,000 in 1922. The company's active selling and production period in 1922 occupied the months of April through December, the first three months being devoted to re-equipping factories, the developing of branch organizations, et cetera. The company has 2,600 dealers now.

New Concern Buys Midland

D. T. Henne and L. I. Hinsch, general sales manager and assistant superintendent, respectively, of the Columbia Tire and Rubber Company, Mansfield, Ohio, have organized a new corporation, and have purchased the Midland Tire and Rubber Company, Coshocton, Ohio.

Both Mr. Henne and Mr. Hinsch have had years of experience in the sales and manufacturing of tires, and they expect to have the Midland's factory producing cord tires and tubes within the next six weeks. The new company intends to equip the Midland factory with new mold equipment. Mr. Henne is well known throughout the Middle West and has a large circle of friends. The people of Coshocton are said to be thoroughly interested in the successful promotion of the new enterprise.

Tyer Makes Rubber Footwear

On May 14 the Tyer Rubber Company of Andover, Mass., commenced to manufacture rubber footwear. The company plans to manufacture a complete line of rubbers, overshoes and gaiters in place of pneumatic tires, discontinued last December. The change of lines required very little alteration of machinery. About 50 girls and a number of men have been engaged, and it is expected that the company will employ between 200 and 300 girls and 100 men by the end of the year.

Newton Falls Concern Operating

The Newton Falls Rubber Company, Newton Falls, Ohio, started operation on May 14. The concern is employing about 200 hands, and officials of the company say that production will total 300 tires a day by June 10. The Newton company recently purchased the plant of the Hubbell Tire and Rubber Company.

Mid-West Meeting Postponed

The Mid-West Rubber Manufacturers Association has announced that the next monthly meeting will be held in Chicago on June 12, instead of being held at Hannibal, Mo., on May 15 as planned.

GOODYEAR MAKES A NEW CORD FOR SMALL TRUCKS

The Goodyear Tire and Rubber Company announced production this month of a new "Heavy Tourist," 30 x 3½ All Weather Tread Clincher cord tire for small trucks and closed cars. This new tire is 10 per cent oversize. It is a sturdy, new heavy duty cord, especially designed and constructed with six plies of cord material to meet unusually severe operating conditions.

The regular Goodyear 30 x 3½ Clincher All Weather cord will continue to be manufactured for the usual type of service. Long staple cotton is used in the new tire and six plies are laid in the Goodyear patented group-ply construction with heavy squeegee between crossed plies. An extra heavy, tough tread insures long wear, and a thick sidewall of rubber is said to provide greater resistance to rut or curb abrasion.

The new tire is expected to be favorably received by those who operate small trucks carrying heavy loads, and by those who require sturdier tires than the usual type of 30 x 3½ clincher cord tire for small closed model cars.

Willis Freed of Embezzlement Charges

On account of the evidence being insufficient, Assistant County Prosecutor Williams asked Judge Maurice Bernon to dismiss the embezzlement charge against Peter F. Willis, former president of the Erie Tire and Rubber Company of Sandusky, Ohio. Willis, who was indicted by the, Cuyahoga Co. grand jury sitting in Cleveland, on April 16, 1920, declared that "the whole affair was a conspiracy on the part of certain stockholders to oust me from the presidency." He said that no moneys were ever paid out of the company's treasury without proper authorization and without the approval of the directors.

Mechanical Rubber Gets Plant

The Aero Cushion Inner Tire Co., Ogden, Utah, was recently sold to the Mechanical Rubber Products Corp. A. H. Sidell, formerly chief engineer of the Gates Rubber Co., and for a number of years with the Goodyear Tire and Rubber Co., is president of the Mechanical Rubber Products Corp. The new organization will manufacture shoe heels, stoppers, balls, tubing, matting, bicycle tires, fruit jars, sponges, etc., and will employ about fifty workers.

Tuscora's Plant To Be Sold

Reports from Dover, Ohio, state that the Tuscora Rubber Company's plant is to be sold to a new corporation for $200,000. According to the terms of the sale one-sixth of the earnings of the new company will be distributed among the old stockholders. Terms of the sale, however, have to be submitted to United States District Judge Westenhaver of Cleveland for his approval.

CALIFORNIA RUBBER EXPERIMENTS

An experiment is being planned by the Department of Agriculture in order to determine the possibilities of producing rubber in the United States. The site selected is near Torrey Pines, California. Advices from Washington state that the plans for such an experiment have been approved. Chinese rubber plants and guayule, have already been successfully grown in the United States, it is stated.

Dr. Breithut Goes to Berlin

On account of the significant developments in the chemical industry in Germany the Department of Commerce has appointed Dr. Frederick E. Breithut as Chemical Trade Commissioner on the staff of Commercial Attaché Herring at Berlin. The Department of Commerce thinks that many of these new developments would be of interest to American chemists, and it has therefore secured the services of a chemist with a commercial background to study present conditions of chemical affairs in that country.

Until his appointment Dr. Breithut was connected with the chemical department of the College of the City of New York. During the World War he was for a time Director of the Bureau of Conservation of the Federal Food Board of Greater New York. He resigned to become a Major in the Chemical Warfare Service. Dr. Breithut is also a member of the American Chemical Society, the Chemists' Club, the Chemistry Teachers' Club and the Society of Chemical Industry.

Brazilians Urged To Cultivate Rubber

Brazilians, who have sojourned in the United States and who have recently returned to their native country, are telling their kindsmen that American manufacturers are determined to cultivate rubber plantations that will be independent of the English fields.

A. Amaral, treasurer of the Brazilian American Chamber of Commerce, in a recent interview at Rio de Janeiro, Brazil, declared that "Brazilians have only a faint idea of the greatness of the United States and its ability to do much in the way of assisting the development of the vast resources of their country." He, furthermore, suggested that it is now up to the Brazilian Government to take the next step to promote the development of its country. He intimated that Brazil has a brilliant future as far as the rubber industry is concerned.

Ajax Sales Up 100 Per Cent

Sales of the Ajax Rubber Company have increased over 100 per cent during the first quarter of the current year, compared with sales for the same period in 1922. Plants are operating close to capacity, turning out about 7,000 tires a day.

FIRESTONE PLANS FOR COKE PLANT IN EMBRYO STAGE

Neither Ford nor Firestone has any definite plans regarding the building of a coke plant in Akron, as press dispatches reported. W. D. Hines, secretary to Mr. Firestone, in a letter addressed to the Editor of THE RUBBER AGE states that "there is no definite information on the matter at present."

During a recent visit of Mr. Firestone at Fort Myers, Florida, Mr. Ford gave Mr. Firestone an outline of what he was doing in securing by-products, including gas, from his coal at his plants in Detroit and Dearborn. He will send Mr. Firestone some details upon the situation as he suggested that it might be possible that Mr. Firestone could establish such a plant in Akron and cut his power costs and at the same time render a public service to the community.

The *Akron Evening Times* in its April 20 issue states that such a plant would cost between $1,000,000 and $2,000,000 and adds that the additional revenue obtained from the sale of by-products would put the company's fuel cost appreciably below its present levels.

In concluding his letter Mr. Hines states that "Mr. Firestone is naturally desirous to do all he can in the matter of rendering a public service to Akron and is going to look into the situation thoroughly. Further than that there is no more information upon the proposition."

Ford May Get Rubber From Weeds

On the grounds that rubber plants will bear a crop of rubber every year—just like wheat or barley—Henry Ford has decided to plant several hundred acres with late bearing rubber plants. He has received a bottle of rubber seeds from the Department of Agriculture, and from these seeds, accordng to an interview published in the Atlanta *American*, he expects to raise a crop of rubber bearing plants. In some districts, Ford says, these plants are regarded as common weeds, and he recalls the difficulty of farmers to get rid of them. These weeds, he maintains, may serve the rubber industry to advantage.

A. E. S. C. Questionnaire Out

The American Engineering Standards Committee are sending out questionnaires to member bodies of the A. E. S. C. in an endeavor to gather material for studying the possibilities of eliminating economic waste. The questionnaire calls for suggestions as to three distinct types of simplification opportunities: Finished products in which the number of lines could be reduced; finished products in which the varieties of each line could be reduced, and raw materials of construction or manufacture which may be reduced in the number of varieties.

Questionnaires have been sent to manufacturers of automobile tires, tire rims, tire fabrics, shoes and rubber, air hose and packing. The survey is being conducted at the request of Secretary Hoover.

CANADA AS RUBBER MARKET IS SIXTH IN IMPORTANCE

Notwithstanding the development of the Canadian tire industry (principally with American capital) and the high protective tariff, Canada affords one of the leading export markets for American made tires. In an outline monograph, prepared by the Rubber Division, U. S. Department of Commerce, it is stated that retail prices in Canada average 20 per cent higher than corresponding prices in the United States. As a matter of fact Canada ranks sixth among the rubber consuming nations of the world, taking about 70 per cent of her crude rubber imports from the United States. The total amount consumed by Canadians in 1922 was 8,374 tons, compared with 10,222 tons in 1921 and 10,781 tons in 1920. All told there are 32 plants manufacturing rubber goods in Canada, representing an investment of $42,787,584, 51 per cent of which is controlled by American interests.

In 1922 Canada imported $916,751 in casings from the United States, $109,391 in tubes and $131,119 in solids. About 60 per cent of the passenger cars used in Canada take inch clinchers, principally in sizes 30 x 3½ and 31 x 4. Canadians are also large consumers of suspenders and garters, importers taking 705,619 pounds, valued at $74,944, in 1922 from the United States. During the past year Canadian importers took 108,368 pounds of waterproofed clothing valued at $46,863, being distributed through the following provinces as follows: Quebec and Ontario, 79,803 pounds; Prairie, 10,305 pounds; British Columbia and Yukon, 11,533 pounds, and Maritime Provinces, 6,727 pounds. During the last nine months of 1922 Canadian imports of rubber boots and shoes amounted to 27,017 pairs, valued at $69,066, 96 per cent of which came from the United States.

In short the possibilities of the Canadian market depends largely upon the condition of the agricultural crops and whether favorable market and price conditions prevail for the same. The long winter periods restricts the sales of tires, while at the same time the market for waterproof rubber footwear and clothing is correspondingly expanded.

Peru A Good Amercan Market

American tire manufacturers practically have an open field in Peru. In 1922 importers in that country took $211,643 in tires, 90 per cent of which came from the United States. Michelin, Continental, Dunlop, Pirelli and Bergougnan, however, are actively engaged in an effort to supplant the more popular American makes.

What is true of tire imports also holds for all rubber goods. In 1922 that country's purchases from the United States, according to figures compiled by the Rubber Division, Department of Commerce, were $276,780 in 1922, $351,088 in 1921, $480,193 in 1920 and $44,155 in 1914. The total imports of all rubber goods in 1921 were $647,731, against $857,252 in 1920 and $457,355 in 1919.

Approximately 95 per cent of the Peruvian imports of rubber belting, hose and packing came from the United States in 1919, imports in that line declining, however, in 1922 to only $39,303. The rubber footwear market is a small one, but 75 per cent of their imports come from this country. In 1922 sundries and specialities were valued at $15,902, while water proofed clothing totaled $8,334.

Dunlop Begins Production

The Dunlop Tire and Rubber Co. of America began production on May 7 in its plant at Buffalo, New York. As announced in THE RUBBER AGE of May 10 the company will distribute its products through the Middle Atlantic and New England states, opening branches at Boston and Philadelphia. Distribution among dealers in the Buffalo territory has already begun. Officers of the American company are: E. B. Germain, president; E. H. Kidder, general sales manager; J. L. Collyer, factory manager, and William A. Golden, Buffalo branch manager.

AMERICAN MANUFACTURERS STRONG IN ARGENTINA

Argentina is the largest single market dependent entirely upon foreign sources of supply for automobile tires. There are approximately 80,000 motor vehicles in that country. In 1922 American concerns sold $1,141,545 in tires and tubes there against $34,451 for all other countries. The number of casings sold in Argentina in 1922 was 94,685.

Strenuous competition has led to the elimination of agents as distributors, the Rubber Division, U. S. Department of Commerce, states. Agents have been supplanted by factory branches of American manufacturers with offices in Buenos Aires.

American concerns sold 463,432 pairs of canvas rubber soled shoes to Argentina in 1922, valued at $369,526. Our rubber soled shoes are to some extent supplanting the native "Alpargatas," the cheap canvas shoes with hempen soles.

On the other hand the mechanical rubber goods market was exceptionally quiet during 1922, a decided decrease being registered. Sales in 1922 totaled $96,834, against $130,896 in 1921 and $391,030 in 1920. The Argentina census in 1913 lists 48,779 factories with an aggregate authorized capital of $1,788,000,000 pesos. These include 5,000 food manufactories, 4,300 wineries and many brick and tile plants, power houses, distilleries, flour mills, sugar centrals, textile mil's, shoe factories, ice-plants and iron factories. Total value of all rubber goods exported from the U. S. to Argentina in 1922 was $1,847,961.

LaRue To Aid In Rubber Probe

Dr. Carl D. LaRue, head of the Department of Botany, University of Michigan, has been appointed by Secretary Hoover to assist in the investigation being conducted by the Department of Agriculture for the purpose of locating the best sources for the development of rubber plantations. For three years Dr. LaRue was associated with the United States Rubber Company, being a representative of the company in Sumatra.

Report of Inventory—Production—Domestic Shipments of Pneumatic Casings—Inner Tubes—Solid Tires

December, 1921 to March, 1923.

"Production" and Shipment" figures cover the entire month for which each report is made. "Inventory" is reported as of the last day of each month.

"Inventory" includes tires and tubes constituting domestic stock in factory and in transit to, or at, warehouses, branches (if any), or in possession of dealers on consignment basis, and as a total represents all tires and tubes still owned by manufacturers as a domestic stock.

"Shipments" includes only stock forwarded to a *purchaser* and does not include stock forwarded to a warehouse, branch, or on a consignment basis, or abroad.

(Compiled by The Rubber Association of America, Inc.)

	PNEUMATIC CASINGS				INNER TUBES				SOLID TIRES			
MONTH	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments	No. Mfrs. Reporting	Inventory	Production	Shipments
December, 1921	64	3,696,519	1,839,738	1,980,264	64	4,731,021	2,070,098	2,522,710	10	168,515	40,478	39,520
January, 1922	66	4,174,216	2,055,134	1,596,806	66	5,246,647	2,343,393	1,889,724	11	181,769	40,224	33,294
February, 1922	66	4,691,329	2,084,308	1,562,365	65	6,141,956	2,596,774	1,702,583	11	183,448	39,492	36,805
March, 1922	63	5,183,286	2,645,790	2,073,963	63	6,991,118	3,017,511	2,090,737	11	182,197	49,433	48,350
April, 1922	65	5,464,336	2,401,187	2,086,651	65	7,230,096	2,650,573	2,329,343	11	173,748	46,664	52,309
May, 1922	65	5,523,095	2,721,503	2,639,273	65	7,189,552	2,970,696	2,938,947	11	170,904	57,640	60,711
June, 1922	64	5,042,147	2,838,890	3,133,260	64	6,186,534	3,130,629	3,973,679	11	169,808	66,089	63,408
July, 1922	63	4,834,106	2,476,636	2,695,095	63	5,675,839	3,068,199	3,630,744	11	176,375	71,505	60,425
August, 1922	63	4,629,392	2,905,209	3,029,823	63	5,207,228	3,808,224	4,220,055	11	189,698	84,313	69,435
September, 1922	64	4,612,037	2,504,744	2,502,106	64	5,164,757	3,501,442	3,558,971	11	200,016	82,767	66,797
October, 1922	64	4,682,958	2,674,662	2,588,770	64	5,488,033	3,787,758	3,420,680	11	213,942	85,480	71,275
November, 1922	62	4,964,976	2,733,134	2,379,708	61	6,210,053	3,850,908	3,075,023	11	234,684	85,775	61,466
December, 1922	59	4,599,204	2,656,942	2,934,079	59	5,732,125	3,411,074	3,825,949	10	244,061	77,221	64,570
January, 1923	62	4,695,916	3,127,270	2,994,297	62	5,838,310	3,951,885	3,748,651	11	262,462	83,383	60,611
February, 1923	60	5,224,387	3,217,987	2,588,639	60	6,771,958	4,039,202	3,001,697	11	270,191	75,457	63,394
March, 1923	58	5,670,601	3,865,726	3,322,637	57	7,740,945	4,875,414	3,828,315	11	265,843	79,788	77,144

Disk Spray Process in Operation

The Following Photographs and Detailed Description of Actual Manufacturing Processes Are the First to Be Published in Any Rubber Trade Paper

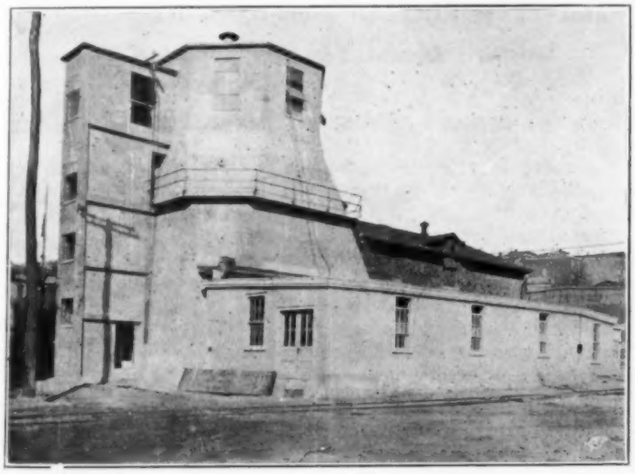
FOLLOWING is a detailed description, non-technical in character which shows clearly the steps in a process which is so revolutionary that the whole rubber world is wondering how far it is going to go in rendering obsolete much that has been accepted as standard for a hundred years, —rubber from sprayed latex.

The spray units are located on the plantations of the United States Rubber Company in the Far East and at New Durham, N. J.

The unit looks something like an old Dutch windmill, with the vanes gone. It is in reality a concrete tower, with a low pressing and baling room built around its base. (Fig. 1) The tower is divided into two parts, a small room at the top and a large drying chamber below.

The latex, as it arrives at the plant in tank cars, is stored in large storage tanks sunk below the level of the ground and conveyed into small tanks in the upper room.

The process through which the latex goes is easily understood. A small stream of latex is permitted to run on a revolving disk in a heated room. The latex is broken up and the particles of rubber fall to the floor, the hot air drying them as they fall. All the useless matter contained in the latex is so thoroughly vaporized that it is carried away in the air, this being facilitated by the fact that hot air is forced through the chamber under pressure.



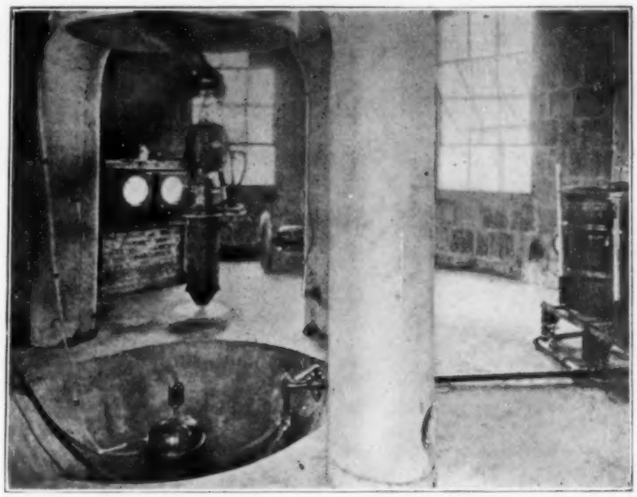
Copyright, U. S. Rubber Co.

Fig. 1—New Jersey Latex Plant

In the upper chamber (Fig. 2) the visitor finds nearly all of the machinery involved in the process. In one corner are the latex tanks. A worker gages the flow by a stop-watch to make sure that exactly the proper amount of latex reaches the revolving disk.

Across the room is the apparatus for heating the air and sending it through the drying chamber under pressure. The heated air is conveyed to a large distributing chamber near the ceiling of the upper room, and then four pipes carry it down through the floor where it is dispersed through a screen into the drying room beneath.

In a deep concavity in the center of the floor of the upper room is the rotor, the electrically driven device which rotates the disk. The shaft of this rotor extends down through the floor into the drying chamber beneath and to the end of this shaft the disk is attached.

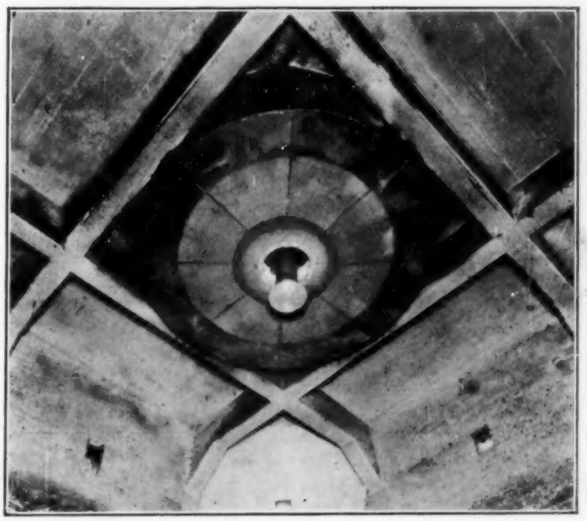


Copyright, U. S. Rubber Co.

Fig. 2—Interior of Upper Room, Showing Rotor in Center, Latex Tanks at Right and Air Heating Furnace at Left

The drying chamber in the lower part of the tower is a cement room, about thirty feet square and thirty feet high.

Standing in the chamber and looking at the center of the ceiling (Fig. 3) the visitor sees the disk mounted on the shaft of the rotor protruding through from the room above. The room is so high that the disk looks much smaller than it



Copyright, U. S. Rubber Co.

Fig. 3—Looking Up at Ceiling of Drying Room Showing Disk in Position

really is. Surrounding the disk is a screen through which the hot air enters the room.

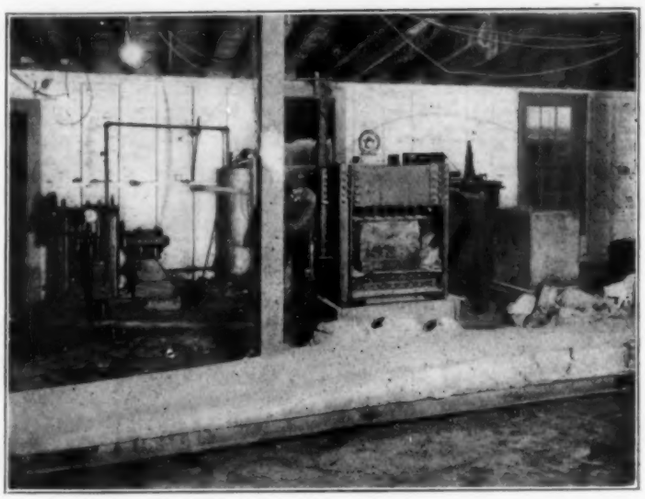
The floor is in moveable sections, each section being mounted on low casters. The particles of rubber fall directly to the floor. When they reach the floor they coalesce until the floor is covered with a spongy sheet of rubber. The floor arrangement is such that one of the sections may be pushed out from the chamber into the surrounding workroom by the simple operation of pushing a new section into the chamber from the opposite side.

Movable Floors Utilized

When the time comes to remove the rubber from the floor one of the sections of the floor is pushed out and wheeled to a hydraulic press (Fig. 4). The rubber strip is pulled off the floor section and pressed into a solid block, about the size of a cake of artificial ice and weighing from 150 to 200 pounds. This completes the operation, and this superb rubber is ready for baling, shipping and use by the manufacturers.

Ammonia is used to prevent the latex from spoiling on its journey from the plantations to this country. In the disk spray process this ammonia is released to such an extent that the interior of the drying chamber is heavy with ammonia fumes while the unit is in operation. But so carefully has the unit been constructed that no odor of ammonia may be detected outside the closed door of the chamber.

Because of these fumes and because of the extreme heat within the chamber, no one enters the inner chamber while the unit is operating. Glass-covered peep-holes are so arranged that the complete operation of the disk may be carefully watched, and provisions have also been made for testing the rubber at regular intervals to assure its good quality.



Copyright, U. S. Rubber Co.

Fig. 4—Section of Floor with Heavy Layer of Rubber near Hydraulic Press

Corrugated Slabs For Rubber Paving

LARGE slabs of rubber 2 inches thick, weighing about 600 pounds are being laid in Manchester, according to *The Rubber Age* (London), in place of small rubber blocks laid singly. The idea behind the laying of the large blocks is to reduce "creeping" or "lifting" to a minimum. The surface

of the slabs is corrugated, giving the appearance of small setts, thus assuring a safe foothold for horses. The slabs are re-inforced at intervals with steel bars for rigidity, while at the same time resiliency and noiselessness are retained. The new pavement is being laid on Cambridge Street, Manchester.

Products from Dry Distillation of Rubber

Scrap rubber was subjected to dry distillation and the products obtained were examined to see if they had any value. It was found that the samples, boiling between 200 and 300 degrees C, and between 300 and 400 degrees C, had no technical value. The fraction boiling below 200 degress C however was found to have some technical applicability. The liquid is very volatile and is easily miscible with common organic liquids, oils, etc. It possesses good solvent properties for rubber, resins, etc. It is possible that this liquid might be used as a substitute for turpentine in the paint and varnish industries; its use as a rubber solvent is impaired by its low boiling point and unpleasant odor. (*Chem. Weekblad*, 1923, 20, pages 78-82.)

Market for Rubber Footwear in British Columbia and Yukon Territory

Prince Rupert is an important fishing port and consequently offers a fair market for fishermen's rubber boots, which are imported chiefly from the United States. Such boots must be heavy and durable. Knee boots, three-quarter lengths, and hip boots are about equally in demand. Retail prices are $8 for knee boots, $9.75 for three-quarter lengths, and $11 for hip boots. There are approximately 1,500 fishermen on American fishing vessels plying between this port and the halibut banks for the greater part of the season, and probably 500 fishermen on Canadian vessels. Most of the rubber boots are sold either to Canadian fishermen or to employes along the water front; the American fishermen usually buy in the United States, where prices are lower because of the Canadian tariff.

Mining, lumbering, and sports boots and shoes are also used quite extensively, considering the comparatively small population. This portion of British Columbia is primarily a mining and lumbering section, and Prince Rupert being the largest distributing center north of Vancouver naturally gets a fair amount of the outfitting business for these industries. The many visiting hunters and fishermen generally purchase supplies before arriving here. Baseball, football, tennis, and basket ball are the principal sports offering a market for other kinds of rubber footwear.

The duty on rubber boots is 25 per cent ad valorem and a sales tax of 6 per cent is collected on the invoice price increased by the 25 per cent duty.

Whether to do busines by direct sales or through agents is a debatable question. This consular district, which comprises all of north central British Columbia and all of the Yukon Territory, is sparsely settled, and most of the business houses are general stores. Once a business connection is established with such firms it may continue for a long period if supplies are satisfactory and the reasonable requests of the purchaser are given prompt attention. On the other hand, the general storekeepers and Prince Rupert retailers are usually more or less in touch with local manufacturers' agents. As imported merchandise is cleared through the local customhouse, a local representative to deal with customs clearances is almost a necessity.

Consul E. A. Wakefield, Prince Rupert, March 15.

Evidences of Increased Interest in Latex

Large Number of Patents Being Taken Out for Latex Processes Indicate Trend of Future Developments

LATEX—whose use is still in the experimental stage—is being given much thought, and today is the subject of much experimentation. Where will its use lead us? Will we look back five years hence and wonder at our lack of belief in 1923? Will the adoption of latex be as slow as were many other processes in the rubber industry?

Up to the present time the largest commercial use of latex has been in paper making and in treating cord tire fabric. In Great Britain rubber latex paper has been successful, it being used to a large extent by the rubber trade. Outside of the rubber industry, however, the advantages of this paper have not been apparent with the result that it has not been universally adopted. Pride in one's own industry and a spirit of support have contributed largely to the use of this paper by the rubber industry. Just as this issue of THE RUBBER AGE is printed throughout on latex paper just so have British concerns used similar paper for stationery, weekly letters, circulars, etc. Supporting a new industry is apparently much more prevalent abroad than here.

Where will the greatest development in the use of rubber latex take place? Will it be in paper or automobile fabrics or tires?

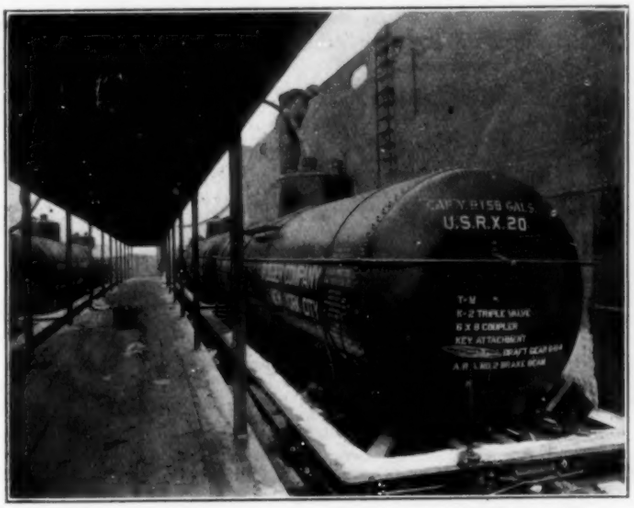
Tires offer the largest single opportunity for the use of latex in the opinion of many in the rubber industry for it is claimed that with approximately a saving of $1.00 on each tire manufactured in the United States, an annual saving of $50,000,000 can be made. In tires whose fabric or cords are impregnated with latex, there can be used a short staple cotton with no loss in strength. The high grade cord tire, for instance, uses a cotton with a staple of 1¼ to 1½ inch, whereas the short staple cotton, which under ordinary circumstances is too brittle and unsatisfactory, is little used. However, this short staple cotton can be used to produce high grade tires when rubber latex is used, and as this grade of cotton can be obtained for about 25 cents a pound cheaper than the long staple cotton, an appreciable saving can be made on each tire.

The spirit of investigation and experimentation taking place with latex at the present time is evidenced by the numerous patents being taken out. Dr. Schidrowitz, for instance, recently vulcanized rubber latex which was maintained as a stable liquid. In other words the crude rubber in the latex was converted into vulcanized rubber without coagulation taking place. What this development might mean to the rubber industry is not hard to foresee according to the *Straits Times* which says, "We shall scrap all our coagulating tanks and smoke racks, and crepe machines and rolling machinery, and then we shall send tank ships with vulcanized latex all over the world, and most of the machinery in rubber factories in America and England and elsewhere will be scrapped also, and a high quality of goods will be produced and new uses will be found. We have handled specimens of cloth dipped in vulcanized latex and then simply dried. They were perfect waterproofs, for rubber made itself part of the actual texture, and they were odorless."

Then there is the use of electrolysis for depositing or impregnating fabric with rubber latex; the smoking of latex in an enclosed drum (described below); the experimentation on synthetic latex by Tuttle and Pelizzola; the de-coagulation of dry rubber back into an aqueous emulsion resembling latex; vacuum drying for latex; the "creaming" of latex by adding a cheap reagent—all of which tend to show the great interest being manifested in this subject.

In a recent issue of THE RUBBER AGE[1] there appeared an article dealing with the recent developments in the use of latex. It was then pointed out that latex had largely been used in paper, tire fabrics and cords, garment proofing, paints and varnishes. Since that time, however, experiments have continued resulting in other improvements, especially in paper, tire fabrics and cords as well as in the transportation of latex from the plantation to the factory.

One of the big problems that had to be overcome was the proper treatment of latex to prevent deterioration and coagulation during shipment. At present the best known preservative for latex is ammonia, since it may be used as follows[2]: In the form of the strong solution known in commerce as Liquid Ammon Fortis, in the form as gas from cylinders of the compressed gas, or generated as gas from salts of ammonia.



U. S. Rubber Co.

Fig. 1—Latex Arriving in Tanks in New York Harbor

The liquid ammonia solution is saturated at a low temperature in a cold climate, but by the time it reaches the tropics it has become super-saturated, and, therefore, is under pressure. The gas, obtained in steel cylinders, is the same as that used for refrigerating purposes in Northern climates, and can be satisfactorily substituted for liquid ammonia. The use of Liquor Ammon Fortis or the compressed gas is limited by its cost.

The third method suggested—that of generating gas from salts of ammonia—has not as yet been adopted in practice. This method is considered by some authorities as the most economical method of preparing ammonia gas. It is suggested that ammonium chloride or sulphate be imported, and that the ammonia gas be prepared directly on the planter's estate.

In applying ammonia to latex about 2 per cent of the ammonia solution is added to the latex, or to be more definite, 3¼ fluid ozs. or 8 ozs. by weight per gallon of latex. All told the strong solution should contain about 28 per cent of ammonia gas when applied to latex.

As ammonia is an expensive chemical, experiments are being carried out to ascertain the possibility of substituting some other preservative. Sodium carbonate, another anti-

1—Jan. 10, 1923.
2—B. J. Eaton, Malayan Agricultural Journal, June, 1922.

coagulant, is being tried. Its use, however, will depend partly on the use to which the latex is applied and its subsequent treatment. If subsequently coagulated by acidification, an alkali such as sodium hydroxide or carbonate may be suitable. Still it should be remembered that free alkali in rubber causes deterioration and produces a lumpy product. So far ammonia is the best preservative in spite of its price.

Latex and Water Soluble Salt

A recent improvement in the preparation of rubber consists in mixing the latex with hydrofluosilicic acid, or other suitable salt, particularly sodium silico-fluoride. Any salt that is soluble in water and that has no deleterious action on latex is suitable. In this respect sodium silico-fluoride is particularly suitable, but salts of metals like copper, which are harmful to rubber, are not suitable. These compounds have the property of coagulating very many times their weight of latex and possess the advantage over the commonly used coagulants, such as acetic acid, that they are antiseptic or fungicidal to restrain "oxidation" of the latex and to diminish the tendency of the rubber prepared in sheet form to go mouldy.

The use of hydrofluosilic acid, or other suitable silico-fluoride, is described as follows: One pound of the powdered material is put into a 150 gallon capacity tank, which is then filled with latex, previously standardized, if necessary, by addition of water to bring it to a dry rubber content of 2.5 pounds per gallon. The whole is vigorously stirred until coagulation is complete.

Mr. John Edwards to whom credit for the above improvement in latex preparation is due, is a member of the scientific staff of the Rubber Growers' Association of Great Britain, and is employed by the Association in the Federated Malay States. Mr. Edwards claims that the new mixture from a planter's point of view has many advantages over acetic acid which are to wit: Ease of manipulation (all that is necessary is to weigh out the correct amount for each tank, throw the powder into the tank and stir. Mr .Edwards has coagulated several tanks, using types that will be described in a later bulletin of the The Rubber Growers' Association, and no trouble whatever has been experienced through lumps, or in any other way.) It is also cheaper to use and is more easily shipped than acetic acid, or any similar liquid.

Coagulating Latex with Smoke

The apparatus, illustrated in Fig. 2, is used to carry out the process of coagulating latex with smoke. (British Patent No. 177,262; assigned to H. A. Wickham and Roa, Ltd. of England.) The latex, which is distributed uniformly over the surface of an endless belt, is coagulated by coming in contact with smoke fumes. The belt is arranged in a suitable enclosed chamber at the lower end of which the smoke enters. The smoke leaves through an opening, located in the upper part of the chamber just a little below the point at which the rubber latex itself is introduced. The outlet for the coagulating smoke is provided with an added piece which prevents the smoke from passing by the opening and thus forces it to leave the apparatus at this point. A sort of trough is also provided to prevent the condensed moisture from flowing back into the smoke chamber.

Since liquid rubber is now available in sufficient quantities paper manufacturers have been experimenting with it. In a recent article on "The Elasticity of Latex Paper"[8] A. D. Luttringer says: "The rubber industry of the World has evinced great interest in the Kaye process of manufacturing rubber latex paper. It has of course particular interest to rubber planters, who are continually on the look-out for new fields in which excess rubber production can be used. The success which this new use for rubber has met in England does not appear to have been attained in the United States, at least not in as great a degree as has taken place in the country of its inception. Just as is true with any new discovery or invention, its pacticality must first be demonstrated so that there may be no doubt about the results that can be secured with it.

"Various articles have been published within the last few months in which a description has been given of the various properties that are conferred upon the paper which is made with the addition of rubber latex. Figures have been given to show that rubber latex has a significant advantageous effect on the finished paper as far as its mechanical and physical properties are concerned. These effects, which may be attainable with the aid of rubber latex, are of course dependent on the proper condition of the latex itself—a state of partial non-coagulation—on the mode of application and on the proportion of the substance used in comparison with the weight of the dry paper.

"It has been found, according to a paper technologist, who writes in the World's Paper Trade Review, that almost without exception the resistance of the paper to tension was increased on the average from 5 to 20 per cent by the use of rubber latex in the manufacturing process, the latter being introduced into the hollander during the beating process. It was also found that the strength of the paper was enhanced from 25 to 100 per cent in the bending test—that is the number of times the paper can be bent at one place without breaking. Furthermore there was an increase in the strength of the paper, both when the test was made in the direction of the paper machine travel and in the transverse direction.

Elasticity of Latex Paper

"The author had at his disposal a sample of rubber latex paper, which had been carefully manufactured with the addition of one per cent of rubber latex to the hollander during the beating process. The idea struck him that it would be interesting to make an examination of this paper from the standpoint of elasticity, that is, to determine just what effect the addition of rubber latex during the manufacturing process had on the elasticity of the paper. The elasticity was determined with the aid of the Pierre Breuil elasto-durometer. This machine measures the rebound of a steel billet. It is well known that the rebound of the steel billet, or ball, after striking the surface of a substance is very sensitively affected by the interposition of a film of material between that surface and that of the ball. In fact only a very thin film of any material whatsoever will effect quite a considerable change in the height of the rebound of the ball.

"The paper, which is prepared with the addition of one per cent of rubber, that was examined by the author, weighed 118.3 grams per square meter. This sample of paper was tested in conjunction with a paper which was similar to the former, but which was manufactured without rubber latex. A square meter of such paper weighed approximately 119 grams.

"The tests were carried out with steel balls of variable dimensions. The exact weights of these balls are given in the following table.

BALL	DIAMETER IN MILLIMETERS	WEIGHT IN GRAMS
Little ball	5	0.5090
Average size ball	8	1.9960
Large ball	10	4.0621

The purpose of using balls of different weights and different dimensions was to check up the observations made on the rebound of the balls. There should not be any great difference in the height of the rebound when the small and average sized balls are used in the tests. Of course, the increased weight of the ball will eventually have an effect on the height of the rebound.

"The tests were carried out by allowing the balls to fall from a fixed height of 250 millimeters, which must be maintained as a constant in the experiments. The balls were allowed to fall successively on a steel plate with no covering of any kind, then on the same steel plate covered with a piece of ordinary paper, whose weight corresponded closely to that of the latex paper, and finally on the steel plate covered with a piece of latex paper.

"The results that were obtained in this experiment are given in the following table. The figures represent the percentage of the rebound in the height through which the ball was originally dropped, that is, 250 millimeters. The figures are the average of several tests.

[8]—*Le Caoutchouc et la Gutta Percha, translated.*

	SMALL BALL	AVERAGE SIZED BALL	LARGE BALL
Steel plate without covering	54	38	36.7
Plate covered with ordinary paper	31	33.5	38
Plate covered with latex paper	32	34.5	36

"It is evident from these results that the large ball does not give reliable results in this test. The weight of the ball is too large to permit the interposition of a paper film between the striking ball and the steel plate to exert any noticeable effect on the height of the rebound. On the other hand, comparable results were obtained with both the small and the medium sized ball, and it is clearly seen from the above figures that the use of rubber latex in the paper increases the elasticity of the paper product. The use of rubber latex in the paper increases the height of the rebound by approximately 3 per cent.

"While there may not be any practical value to this property of rubber latex, nevertheless it is interesting to note that rubber, incorporated with paper, lends elasticity to the paper, conferring upon it in part its own most characteristic property."

While the use of latex in paper is comparatively in its nascent state tire manufacturers have made considerable progress, and their experiments show that cords immersed in latex possess greater endurance according to results obtained by the United States Rubber Co. The cords, wound on a reel, are passed through latex contained in a tank. In the tank the latex treated cords are still in parallel relationship, and the latex fabric is wound, after being dried on a series of dry cans, on a wind-up roll. Now it is ready to be used in tires, belting and other products.

It is claimed that the latex fabrics produced by this new process "possesses exceptional resistance to separation of the rubber and cord." Thus more wear from tires, hose, belting and other articles is insured. This additional strength is due to the fact that the rubber can be stretched uniformly, and consequently the strain from bead to bead in a tire is more evenly distributed. This extra endurance is attributed to the increased penetration of the latex into the fibres of the cords. It, furthermore, is contended that rubber so applied may be easier and more rapidly vulcanized than rubber applied by friction. Another advantage of latex coated cords, compared with coating by solutions of rubber and other volitale solvents, is that in the drying process with latex water is evaporated whereas a solvent must be used in the older method.

The fact that new uses for rubber latex have been found

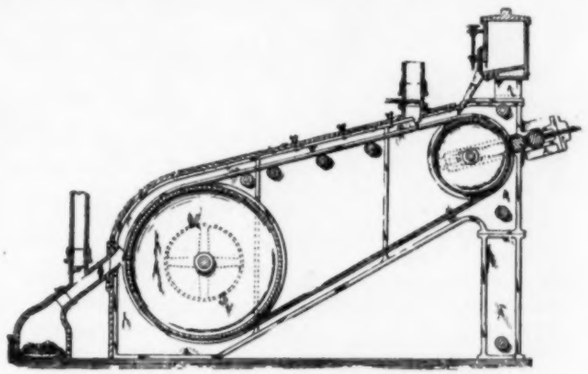


Fig. 2—Apparatus for Coagulating Latex by Means of Smoke

insures a larger market for plantation rubber as well as a larger income for the planter. Besides with an increasing demand for rubber and its products new capital will be attracted to the development of rubber plantations. It is already intimated that rubber latex may be used in the manufacture of slate and tile for building purposes; that a rubberized and waterproofed varnish may soon supplant paints and varnishes used today. Rubber latex can also be used in blocks for paving streets, experts claim.

The Resilient Energy and Abrasion Resistance of Vulcanized Rubber

The author made a study of the abrasion resistance of vulcanized rubber with respect to the effect of reinforcing pigments in enhancing this property, and to determine through experiments the relative merits of some mineral and inorganic pigments. Pigments selected were zinc oxide, gas black, light magnesium carbonate, china clay and colloidal barium sulphate, as well as lithopone, usually considered as a phyisically inert pigment.

Tests were made in a laboratory as follows: A carborundum or other abrasive wheel is rotated by a motor for a certain period under a fixed load, against the surface of the rubber block which is being tested. From the loss in weight and the specific gravity of the compound the volume loss is calculated. Secondly, several blocks or strips of the compound are arranged to roll under a fixed load over an abrasive surface. From loss in weight and the specific gravity of the compound the volume loss sustained during a stated number of revolutions is calculated. Thirdly, circular rings (inner diameter, 1.75 inches, outer diameter, 2.25 inches), stamped by means of a steel die from a sheet of rubber compound about 0.125 inches thick are weighed and placed between steel separator rings on a steel spool and clamped in position, permitting two-thirds of each ring to be exposed to the action of the abrasive. After a certain number of revolutions the rings are removed and the loss in weight calculated as before.

Conclusions are: The compound to have the highest possible resistance to abrasion should have the proper combination of three properties—high tensile strength, high resilient energy capacity and sufficient hardness or rigidity. High tensile strength is obtained by using high grade accelerator mixing, compounded with correct proportions of suitable reinforcing pigments. To obtain high resilient energy it is necessary to use a pigment which gives great rigidity and high tensile strength together with one or more pigments that give high extensibility. High abrasion resistance is obtained by compounds containing gas black and magnesium carbonate. Maximum abrasion resistance is given by compounds containing 10 : 5, 12 : 6 and 14 : 7 volumes gas black to magnesium carbonate.

By H. W. Greider, presented before the Division of Rubber Chemistry of the American Chemical Society, Pittsburg, Pa., Sept. 4 to 8, 1922. Abstracted from *Industrial Engineering and Chemistry*, May, 1923.

Effect of Variations in the Sulphur and Hexamethylenetetramine Content Properties of Compounded Rubber

The author's purpose is to study compounding of rubber and sulphur as applied to tires. He chose a compound containing 100 volumes of rubber, 10 volumes red zinc oxide and 20 volumes of carbon black. The sulphur content varied from 10 to 4 per cent by weight and the accelerator content from ½ to 2.2 per cent by weight.

Tensile strength and elongation were determined on an autographic Olsen testing machine. The samples were allowed to stand for 2 weeks, and the degree of the bloom observed. Free sulphur was determined only on the 75-minute cure.

Results showed that stocks became non-blooming with free sulphur contents (calculated to 100 of rubber) of 1.1, 1.4, 1.0, 0.8, 1.2, which average 1.1. A heavy bloom results with 2.0 per cent free sulphur.

Hence, the author concludes that in nonblooming stock, the total sulphur added calculated on the rubber should not exceed the desired vulcanization plus one. A nonblooming stock with a vulcanization coefficient of 2.2 should not contain over 3.2 per cent of total sulphur. The article is well illustrated with tables, showing results of the examination of vulcanized rubber.

By Harlan A. Depew, presented before Rubber Division of Rubber Chemistry, American Chemical Society, Sept. 4 to 8, 1922. From *Industrial and Engineering Chemistry*, May, 1923.

What Is the Future of Rubber Latex?

Uses of Latex Are Almost Unlimited Due to its Adaptability — Other Industries Will Benefit from its Use — Cost Is Limiting Factor Now

IT is difficult to forecast the future possibilities of Latex in the rubber and other industries. At the present rate of progress, in the development of uses for Latex we can expect some radical departures from present day methods. Will latex sprayed rubber supercede the plantation crepe and smoked sheets? This new processed rubber is claimed to be more uniform in Character than other types. Uniformity of crude material is desired by all manufacturers.

The idea of shipping such an unstable product as latex, in any quantity was considered in the past as being more or less impossible. However these difficulties have been largely overcome. Efficient preservatives have been found. Bulk shipments in tank steamers are now being made regularly by one large rubber company. The latex is stored in receiving stations in the East and pumped into tank steamers, brought to New York and then pumped into tank cars for delivery to their factories here.

The question of economical containers for smaller shipments still requires attention.

The percentage of water present in Latex varies from 60—70%. It is not unreasonable to expect that means will be found to reduce the water content of the latex on a commercial scale and still keep it in the reversible form, so that water may be added here and a normal latex obtained.

This has already been accomplished in the laboratory, but has not been perfected for commercial practice.

If this can be done, it will bring the price down to approximately that of crude rubber.

In regard to the direct uses for Latex, the one outstanding use at present is for the impregnation of the cords in the cord fabric for tires. This process is in use commercially and it is claimed to be of great advantage. It is also being used in certain types of mechanical goods and novelties. For moulded articles and dipped goods with some modification it would seem that latex has great possibilities.

It is possible to incorporate in the latex practically all of the usual compounding ingredients for vulcanization.

Latex, containing vulcanization ingredients may be partially coagulated to a pasty consistency whereby it may be spread on fabric with the usual spreading knife. The advantages latex mixtures have over compound rubber are that of uniformity of "mix" and of subsequent tensile strength. As latex has not been subjected to any milling or breaking down proeesses it is reasonable to expect it to possess greater strength.

It would seem that latex would find application outside the rubber industry wherever a strong adhesive is required.

Mixtures of latex, with clay leather or cork, paper and wood pulps, when moulded, or subjected to pressure; present possibilities as insulating, sound absorbing, water resisting products.

It is likely that latex can be used in the preparation of specialty papers, but owing to cost, its uses along these lines will be somewhat limited.

A great deal of experimental work will be necessary before the use of latex becomes general, but it is bound to come.

Latex bends itself so readily to such a variety of modifications that its possible uses are almost unlimited. The cost of latex will be the limiting factor.

The rubber industry collectively has made such rapid progress in the past that we can look forward to seeing some very interesting developments in the uses of latex in the near future.

Rubber Plantations in Cochin-China

The Editor is in receipt of the following letter from a reader in France who is endeavoring to interest capital in rubber plantations in Cochin-China. Inasmuch as the Department of Commerce rubber investigation does not concern itself with developments of this character, the letter is printed here in full for the guidance of any of our readers who may be interested.

Editor, THE RUBBER AGE:

We have become acquainted with your publication at the American Chamber of Commerce of France, of which the writer is a member. Feel that you are able to bring to the attention of certain rubber interests in America the following proposition that we intend to propose in the near future.

Some French friends of ours have charged us with the development of their rubber plantation in Cochin-China. Because of the recent Stevenson Act in England, think that it offers some individual manufacturer of rubber products (or group) the opportunity of assuring themselves a permanent source of rubber on very advantageous conditions.

About twelve years ago, they began, at governmental instigation the cultivation of rubber in the Saigon district. Since the Indo-China piastre is a very high rate of exchange, and because of the low price of rubber in 1921 and 1922, only about 20 per cent of their present production has been tapped, and a very fine quality of rubber is being produced. A minimum of 500,000 trees may be grown on the plantation, not figuring certain optional rights on surrounding territory, some of which is already producing rubber. The soil is very rich, and rubber may be obtained after less than five year's growth.

All the equipment necessary for an intensive cultivation has already been provided. The owners, although very wealthy, realize that it is not sound business for them to invest French capital in an extensive cultivation of their interests, notwithstanding the recent encouraging increase in the value of rubber. They can now produce at a profit, but the piastre is very high for development. The general principle of our friends is that should certain American interests provide the necessary capital to increase the production of the plantation, a mutually satisfactory arrangement could be made.

We are addressing this letter direct to you, in the hopes that you might be able to put us in communication with the right organization in the U. S. for a Franco-American collaboration in French rubber-growing territory. Immediately on receipt of a letter or a cable from you expressing your interest in the matter, will be very glad to forward you further details and will be very glad to discuss the matter, either in the U. S. or here in France, with interested parties.

Very truly yours,

THE CONTINENTAL AGENCY
Per A. Fred Goldbeck
European Director

From The Continental Agency,
2 Rue Edouard VII,
Paris (IX), France.

Building Tires on Flat Steel Drum

First Photographs of the New Flat Band Method of Building Tires Developed by the U. S. Tire Company

THE accompanying illustrations give details of the new method being used by the U. S. Tire Company in building tires. As previously announced in these columns, this process consists of the use of a flat collapsible steel drum instead of the steel core in use by other manufacturers.

This development has been in use for some time by the U. S. Tire Company but announcement of its use was witheld pending decisive road and laboratory tests on tires built by this method.

As the illustrations show, the tires are built flat on a collapsible drum, the tread and breaker being placed, still flat, on the fabric layers. In this way it is claimed an even tension is obtained in the cords after inflation.

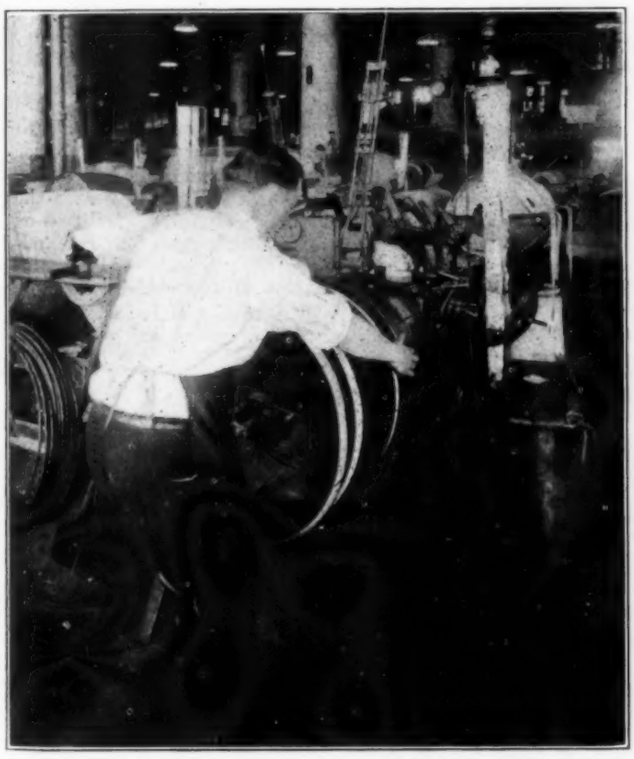
The tire, in flat shape, is then taken off the drum and is inflated or formed to shape in a gentle, easy manner by internal pressure thus assuring no harsh adjustment of the cords or movement in relation to each other. Vulcanization is by means of pressure of a gas in direct contact with the inner surface of the casing.

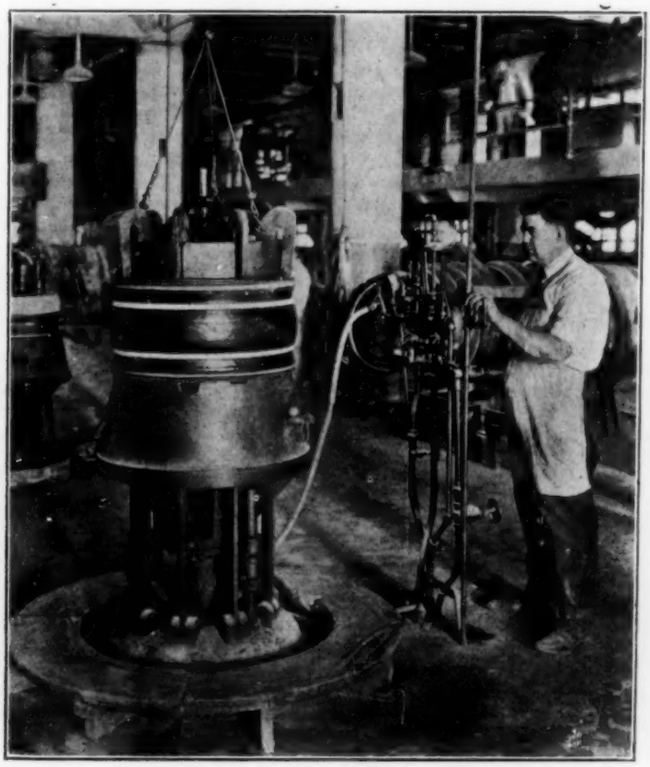
It is claimed that absolute uniformity of compaction in the tire walls takes place and that each cord takes its natural normal position in the carcass. 'Balanced in structure and strength' is the designation given to tires made by this process by the company in its advertisements.

The plies of these tires are of web cord (cords impregnated with latex) and the tread consists of the new sprayed rubber made by the Hopkinson process.

Above—Starting to Build Tires By Flat Band Process
Lower Left—Removing the Tire
Lower Right—Ready to Inflate

(Photos Courtesy U. S. Tire Co.)





New Tire Types and Sizes

Predicts Early Adoption of Thin Carcass Tires of Greater Cross Section and of Smaller Rim Diameter than Present Types and Sizes

By F. A. Seiberling

President Seiberling Tire and Rubber Co., Akron, Ohio

WHEN the American automobile first advanced from the experimental stage, wheels of large diameter and tires of small cross section were the vogue. The bad roads which faced automobiles, argued for large tire circumference.

In early days, it was common to see tires of sizes 36 x 3½, 38 x 4, 40 x 4, 42 x 4½, 43 x 4, and even 44 x 5½. These sizes were quite common in 1910 on the more expensive and heavier cars. The trend during the years since however has been steadily downward. American car makers have recognized the benefits which accrue from the smaller wheel. Instead of the 36 x 3½ tire of 1910,—you see today the 30 x 3½ as standard size for the Ford type car.

In the 4″ tire size, American makers have come from 40 x 4 through 36 x 4, 34 x 4 to the 33 x 4 which fast is waning in favor of the 32 x 4,—which in turn, is already beginning to lose caste in favor of 31 x 4. That tires as small as 28 x 4 will appear for future standardization, is very probable.

The story is the same on the 4½″ and 5″ size, where early 42 x 4½ and 43 x 5 sizes have passed into oblivion. The 36 x 4½ and 37 x 5 first took their place, but were eliminated by 34 x 4½ and 35 x 5,—which 32 x 4½ and 33 x 5 are now putting in the discard. In turn, the position of these last named tires is being jeopardized by the approach of 29 x 4½ and 30 x 5.

The story of the revision downward in wheel diameter is the same for the pneumatic truck tire as for the passenger car tire. The first tire we saw of the 6″ cross section, was 39 x 6. This size gained small popularity, before it was superseded by the 24″ rim diameter with the 36 x 6, 38 x 7, 40 x 8, 42 x 9 and 44 x 10 tires, which have been recognized as standard. But even these sizes are passing. The 24″ rim diameter does not meet the needs of the engineer. His truck platform is too high from the ground,—his gear ratio is too radically different from the solid tire practice. He is looking now to the 20″ or 18″ rim diameter, with perhaps size 32 x 6, 34 x 7 and 36 x 8 tires.

In a measure, the American car and truck builder who is contemplating the use of smaller wheels, is only following European practice. European engineers, not confronted by the bad road conditions which were prevalent in America ten years ago,—early concentrated upon smaller wheels. Some of the older European cars are still running with 810 x 90, 915 x 105, 920 x 120 size tires. 710 x 90, 815 x 105 and 820 x 105 however, which correspond to our 28 x 3½, 32 x 4 and 31 x 4½ are now in general use, while sizes even smaller than these are in considerable use.

It is safe to predict the early advent of the 20″ rim as standard for both passenger cars and trucks. It only remains to be seen whether American engineers will be satisfied to stop with a 20″ rim diameter, or whether they will go further even, to an 18″ rim diameter.

And the reduction in wheel and rim diameter is only one phase. We may anticipate a further radical change in construction which affects tires, particularly.

The desire of the car manufacturer, and the purpose of the tire manufacturer, will be to develop a tire, not only of smaller rim diameter but of larger cross section, and more flexible in carcass,—the cushion more flexible and less liable to the ravages of internal heat to which the present thick carcass tires are susceptible.

For example,—it is quite possible that the present 33 x 5 tire, made of eight plies of cord fabric, and run with a recommended inflation of 70 lb. will be superseded by a new type of tire, perhaps a 32 x 6—a six-ply tire to be inflated at possibly 40 lb. of air,—or by 34 x 7, a four-ply tire, to be inflated at 25 to 30 lb. This development to take the place of the 33 x 5 tire, typifies the probable evolution of the present tire type, during the next several years. The cars of three years hence will be equipped with tires which will be flexible and resilient,—not only because they will have a greater air capacity, but also, they will be of less rigid construction.

It is logical to expect that the 28 x 4 will replace the 32 x 4, and that 29 x 4½ will replace 33 x 4½,—and that we shall have a 30 x 5 tire as an oversize for 29 x 4½. Already, a number of car manufacturers are experimenting with this new size.

Summing it up, the trend of automotive construction has been and will be toward a smaller wheel diameter and toward a more flexible tire of greater air capacity to be run at lower air pressure. Car and truck manufacturer and user alike, desire an ultimate car and truck type with body nearer the ground,—easier to enter, of smoother riding quality,—of better appearance,—utilizing the motor's power to best advantage.

The coming several years, will see in the writer's opinion, great strides toward these goals, which will be attained in large part by the reduction of wheel diameter and by increase in tire cross section and tire flexibility.

Plantation Rubber in British North Borneo

At the end of 1921, 58,300 acres were planted to rubber, about 30,000 acres of which were in tapping. In 1920, 4,105 tons of rubber were exported and in 1921, 3,125 tons. During the first half of 1922, 1,633 tons were imported, 193 tons to the United Kingdom, 821 tons to Singapore and the balance to the United States and Japan. At present no organized restriction is in North Borneo, where the companies already established are free from export duty until 1955. To what extent they may voluntarily restrict output in cooperation with Malaya and Ceylon is not known.

Mexican Rubber Factories Closed

At the present time the two rubber factories are not operating. The government recently doubled the import tax on automobile tires and lowered the duty on certain fabrics to enable these industries to resume operations, but it is not known whether they will be able to do so.

February Exports from British Malaya

Total exports of rubber from British Malaya in February, 1923 amounted to 19,910 long tons, as compared with 22,871 tons in January, 18,427 tons in December, 1922; and 21,642 tons in November, 1922.

Development of Rubber Insulators

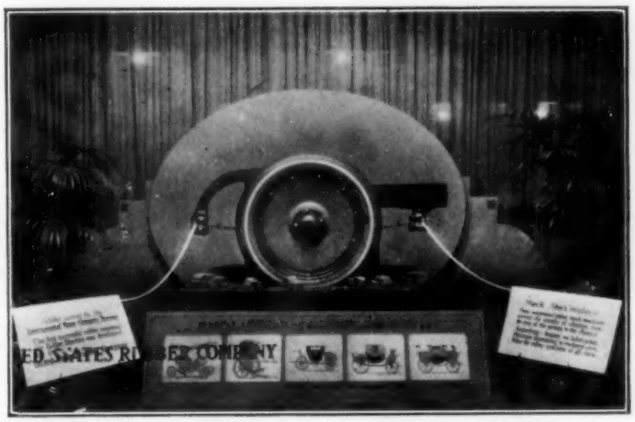
Rubber Spring Shackles Increase Life of Tires, Reduce Up-Keep and Do Away with Grease Cups, Shackle Bolts and Nuts

ONE of the latest uses that has been made of rubber is the equipping of motor vehicles with rubber "Shock Insulators." Passengers riding in motor vehicles equipped with pneumatic tires and rubber shock insulators are riding on rubber twice. The same also holds true for loads carried in commercial vehicles.

The effect of riding in a passenger car equipped with insulators made of rubber can hardly be appreciated until one actually rides in such a car. There is an additional quietness, resiliency and a reduction of vibration that are most noticeable when the car is traveling at high speed over rough roads. At the same time there is an added resiliency in relation to shock absorption when traveling at slow speed over rough going. The impacts from shocks at slow speed are somewhat lessened inasmuch as blows are not transmitted through solid metal parts direct to frame and body, but must pass through the yielding elements of rubber placed between frame and running gear.

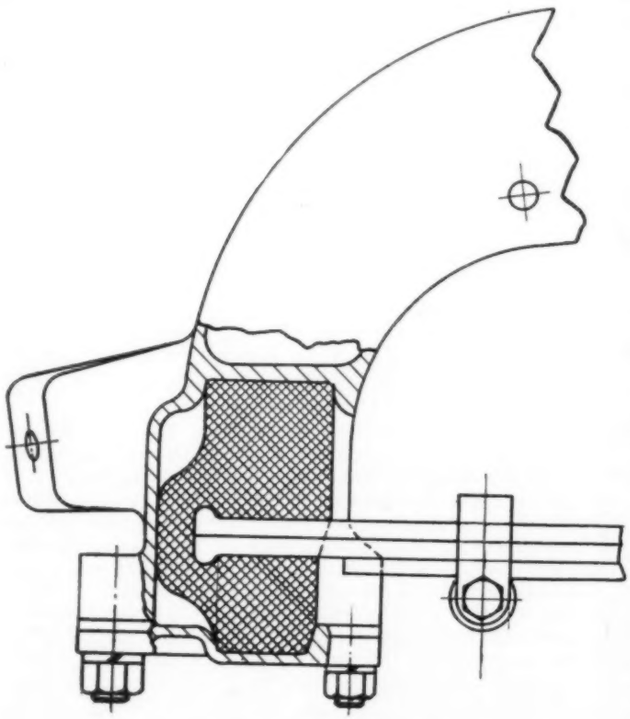
A fact that is not generally appreciated is that spring breakage usually occurs on the rebound or secondary blow after an obstacle has been passed over, and not on the first or primary blow as sometimes asserted.

From tests made by The International Motor Company, by means of seismographs, using a vehicle equipped with rubber shock insulators against others equipped with standard shackles, it has been determined that the jarring action of the primary blow is approximately the same in each case; whereas on the rebound or secondary blow, the recording instrument showed that the blow from the rebound was almost as great as the primary with steel shackles, while the blow from the rebound was less severe than that of the primary when rubber shock insulators were used.



Display in window of U. S. Rubber Co., showing an automobile wheel mounted to show the effectiveness of the rubber shackles which it makes for the International Motor Company

Again, shocks occasioned by starting and stopping and many of those met under general running conditions are cushioned longitudinally by means of the thrust sections of the insulators that are placed between the spring ends and the housings which encase the insulators.



Front End of Forward Spring

Advantages of the Rubber Insulator

Some of the advantages claimed for the rubber "shock insulator," frequently called the rubber spring shackle, are: There is no lubrication required; the upkeep is a great deal less as there are no grease cups to look after, there is no oil, no dirt, no cleaning; there is no friction between surfaces, and consequently there is no wear, looseness or rattle. It prevents twists in the spring; it takes side thrust through snubbing cushion instead of through jarring metal-to-metal contact. It gives a cushion blow instead of a metallic blow of the old metal-to-metal shackle. It greatly reduces the crystallization of frame and springs set through vibration and transmitted by the shackle of the old type. It lessens the possibility of nuts and rivets loosening up. It increases the life of tires; it does away with spring eyes, bronze bushings, hardened and ground steel pins, grease cups, shackle bolts and nuts. Due to this yielding suspension, skidding on wet roads is minimized. Tests show 20 degrees lower temperature of spring with shock insulator than on spring with old shackle, because the rubber does some of the work that the steel spring has to do. Motor vibrations are also partially snubbed.

Mechanics of the Rubber Insulator

One of the characteristics of rubber is its elasticity. The form of other substances may be distorted, but the degree of distortion, or change of shape, to which rubber can be subjected and yet return to its original form through its own efforts is amazing. This characteristic of rubber is not as yet thoroughly appreciated by the engineering profession. It is true that different grades of rubber vary in respect to the completeness with which the original form is restored

after the cause of distortion is removed. Again, the amount of energy that rubber is capable of storing is far greater than that which a steel body of equal size can store. A striking example of this property is to take test pieces of rubber and steel 2 inches long and ⅛ inch by ¼ inch in cross section and stretch each piece to a point where further loading would result in permanent set of the steel or failure of the rubber. The following conditions show the result of typical tests:

	RUBBER	STEEL
Elongation	11.5 inches	.0053 inches
Load in pounds	56.0	2500.00000
Energy stored in pounds	322.0	6.6000

This shows that the stored energy ratio is approximately 48.8 to 1 between rubber and steel, and means that rubber more readily adapts itself to elongation or change of contour —a qualification required in the rubber shock insulator.

Rubber under compression or in tension is unique in its ability to absorb vibrations. This ability, roughly speaking, is inversely proportional to the extent to which the rubber is stressed. For example, a golf ball, in which the rubber threads are tightly wound, is livelier than one in which the threads are lightly wound, this being due to its sensitiveness in responding to impacts. A solid rubber ball if hit by a golf stick will be dead—having no flight. It is necessary to put the rubber in tension or under compression in the static condition so as to return all the energy of impact.

The rubber shock insulators are assembled in housings under compression, and as the rubber is stressed to a comparatively slight degree, the property of, or sensitiveness to, shock absorption is obtained. This initial compression is applied for three reasons:

First: Rubber in the free or stressed state, to keep its life must be continually working; hence the insulator being mounted under compression, all parts of the insulator under running conditions are continually working, which act prolongs the life of rubber.

Secondly: Compression is applied to the rubber to prevent the spring ends pulling out the insulators or getting away from their correct relations therewith.

Thirdly: Both the upper and lower columns of rubber must be in contact with the spring, and because of the initial compression, the spring is held in suspension at all times. The insulators are so designed that pressure is never entirely relieved in either the upper or lower columns of the rubber. No "free movement," of action, takes place between spring leaf and rubber,—or the rubber and its retaining bracket. All the action is in the mass of rubber under compression—it lives, jellies, moves.

This shows, according to the manufacturers, that the rubber shock insulator suspension is very desirable for vehicles inasmuch as it possesses remarkable properties as regards the absorption of the high frequency vibrations of low amplitude which are so destructive of riding comfort. At the same time shock insulators possess some resiliency in respect to yielding to low frequency vibrations, which in effect is equivalent to lengthening the spring itself, and is the result of the static energy of position of the insulators due to the initial stress or compression when assembled in the housings.

Spring Construction

When adapting the rubber shock insulator to any car, the aim should be to keep as nearly as possible the ground clearances which prevailed with the steel shackled spring, under normal or full loads. The springs flat under load have an added value when used with insulators, inasmuch as there is less flexing of the rubber in a longitudinal direction, and this results in reduced strain on the structure of the insulator, which adds to the length of its life. Springs that are perfectly flat, or have a small reverse camber under full load, give the best general results in action for both front and rear springs.

Close-up view showing the Mack rubber shock insulator. The molded rubber replaces the usual spring shackle. The ends of the spring are embedded in the slotted openings of the insulators, which are carried under pressure in cast steel boxes that form a part of the spring brackets, at either end of the spring.

Shock Insulator Blocks add to passenger's comfort while riding, increases driver's control of car, aids in preventing skidding, reduces operating costs and are a factor in obtaining better mileage.

On the Hotchkiss Drive the value of sending the driving effort along a normal straight line can readily be appreciated as there is less tendency of the springs "buckling," and this relieves the brake from some of the strain and gives the operator easier control of the car.

The "rake," or replacement angle of the steel shackled springs, is a point where engineers try to incorporate the rubber shock insulator mounting. This is controlled by clearances and such construction as will give the best possible results in the way of a good looking design of front and rear spring brackets. The front springs are never given less than 2 degrees of normal "rake," while rear springs can usually mounted parallel to the ground line, and under no circumstances are the rear springs so mounted as to have a reverse "rake" with the car considered traveling in a forward direction.

In short, the advantages of rubber shock insulators are: they increase the passenger's comfort while riding; they increase the driver's control of the machine—i.e. prevents skidding. They also reduce operating costs and aid in obtaining better tire mileage.

Artificially Rigged Rubber Market Result of Stevenson Plan

Prices Should Not Be Regulated By Statute for Law of Supply and Demand Governs Them

John J. Watson, Jr., may be called the father of the rubber plantation movement in the United States. It was he who first suggested to the directors of the United States Rubber Company in 1908 that they investigate the possibilities of cultivating rubber in the Far East. In 1910 while Mr. Watson was acting head of the U. S. Rubber Co., he succeeded in having that company appropriate $3,000,000 to purchase lands in Sumatra.

Mr. Watson has been actively associated with the rubber manufacturing industry for thirty years, and is at present the president of the Lee Tire and Rubber Company.

JOHN J. WATSON, JR.

JOHN J. WATSON, Jr., president of Lee Tire and Rubber Company, declared in an interview with a representative of THE RUBBER AGE that American rubber manufacturers are forced at present to rely upon an artificially rigged market for their basic material—rubber. He said that the "great penalty that the American manufacturer is paying under the Stevenson Plan to the English capital invested seems to warrant serious concerted action on the part of the American manufacturers together with help from our Department of Commerce to use such influence as can be brought to bear to accomplish the repeal of the Stevenson Restriction Act so that the great rubber industry can be put back on a sound basis as to the market for its principal raw material rather than forced to operate on an artificially rigged market, such as the Stevenson Restriction Act now permits."

Mr. Watson favors the development of rubber plantations in the Philippines, but advocates that the present immigration laws be made more flexible so as to admit contract labor from Java, India or China. He, however, asserts that capital will not flow into plantation investments there without modification of the present labor laws.

As Mr. Watson sees it the Stevenson Restriction Act is not to be used to unduly advance the selling price of rubber. But a market in which the supply is tampered with produces a most unsound effect upon the rubber manufacturing industry, for at the present time the manufacturer must buy his materials in a market where he has no assurance that this control may not be withdrawn resulting in a great decline in price, or that further restrictions may be put in effect.

Mr. Watson's statement is as follows:

The large increase in the consumption of crude rubber brought about by the rapid growth of the automobile tire industry commenced to seriously affect the supply of crude rubber in 1908, and caused concern in rubber industries as to their ability to procure their crude supply.

At this time Brazil was producing about sixty per cent of the world's production of crude rubber, the Far Eastern plantations less than five per cent, the balance coming from the Congo and other sources.

The increased demand for rubber had its effect on advancing the market price, which, however, did not result in any large increase in the tonnage of native rubber produced.

The English and Dutch realized this situation before American manufacturers, and had started planting rubber on an extensive scale in the Far East. There were plantations at this time of about 700,000 acres, only a small part of which were in bearing. Rapid progress was made in planting, and at the beginning of the world war had exceeded 2,000,000 acres, and at the present time approximately 3,250,000 acres have been planted, of which over 2,750,000 acres are probably in the production state.

Available statistics show that the production from rubber plantations has grown from 3600 tons produced in 1909 to in excess of 350,000 tons in 1922. The large increase in the demand for rubber advanced the price in 1910 to as high as $3. per pound; whereas, theretofore $1. per pound had been considered a fair average price.

With this high price, plantation owners brought their estates into bearing as rapidly as possible, with the result that during the war an enormous amount of rubber in excess of the world's requirements was produced at a period when rubber manufacturing, owing to war conditions was restricted and shipping facilities were not available, owing to the war. After the war this rubber rapidly found its way into the consuming markets, with the result that in 1921 spot rubber was reported to have sold in New York at as low as 12c per pound. This price did not in many cases yield to the plantation owners tapping and marketing costs, to say nothing of yielding a return on their capital invested, or the cost of bringing their plantations into bearing, which had consumed a period of four or five years without any return on their investment.

The low market price generally demoralized the industry

and made it impossible for some of the plantations to procure capital with which to complete their work, and to bring their plantations into bearing.

With the large amount of English capital invested in the industry, a strong demand for Government help sprang up from those operating plantations and from those investors who had put capital into the industry.

In November, 1922, by the adoption of the Stevenson Rubber Restriction Plan, the shipment of rubber from the English controlled Colonies was limited with the effect that rubber advanced under its operation to about 35c per pound in the consuming markets. At this price it showed a good return to the plantation companies, enabled them to make a showing of profit sufficient to induce additional capital, and to enable them to operate upon a profitable basis.

The argument in favor of this plan was that the English manufacturers would only have to bear about ten per cent of the additional cost of crude rubber caused by the advanced selling price under the Stevenson Plan: whereas, the manufacturers of the United States and other countries would bear ninety per cent of this additional cost, and practically the entire profit from the advanced price would revert to the benefit of the English capital invested in the plantations.

The rubber industry of the United States consumes probably seventy-five per cent of the world's consumption of crude rubber, and is wholly dependent for its supply from foreign markets.

It is apparent that the Stevenson Restriction Act at the present is not to be used to unduly advance the selling price of rubber, because they realize that this would restrict or limit the uses in new growing fields in the industry which are needed to consume the maximum tonnage possible when the large acreage under plantation comes into full bearing.

The Stevenson Plan, while from the English viewpoint was undoubtedly wise at the time, has a most unsound effect upon the rubber manufacturing industry. Manufacturers under it are forced to buy their supply of rubber at prices controlled by an artificial market, practically fixed by Government control, and irrespective of the ordinary law of supply and demand. A successful and sound manufacturer in any industry governs his operations by the supply of raw materials, their conditions in the primary markets; and on his judgment as to the time for him to stock up with raw materials depends the success with which he conducts his business.

At the present time he must buy his most important raw materials in an artificially controlled market where he has no assurance but what this control may be withdrawn resulting in a great decline in price, or on the other hand, further restrictions may be put in effect, which is possible under the Stevenson Plan, and where his fixed selling price for future deliveries of goods may place him in a position where he has taken orders that cannot profitably be filled. It has eliminated and taken from the manufacturer any value he possesses that as a student of his industry he may have acquired through years of manufacturing experience and his study of the markets of his raw materials.

The plantations in the Dutch controlled Colonies are without any restriction as to their production or the amount they can ship, and they are receiving benefits from the restriction in operation in the English Colonies.

The only territory in control of the United States that is adaptable in any way to the production of rubber, is the southern island of the Philippines, and it seems improbable with our present labor laws that any capital can be induced to invest in rubber plantations in the Philippines unless there is an assured modification of our labor laws, which would enable us to bring into the Philippines contract labor from Java, India or China.

The great penalty that the American Manufacturer is paying under the Stevenson Plan to the English capital invested seems to warrant serious concerted action on the part of the American manufacturers together with help from our Department of Commerce to use such influence as can be brought to bear to accomplish the repeal of the Stevenson Restriction Act so that the great rubber industry can be put back on a sound basis as to the market for its principal raw material rather than forced to operate on an artificially rigged market, such as the Stevenson Restriction Act now permits.

American rubber manufacturers should receive and are entitled to expect support from our Government to develop rubber plantations in the Philippines, so that the great rubber industry of the United States could at least, to some substantial degree, produce a part of the most important raw material which goes into the cost of all manufactured rubber goods.

A New Process for the Vulcanization of Rubber Containing Ultra-Accelerators

By Ugo Pestalozza

Italian Pirelli Society, Milan

THE use of certain ultra-powerful accelerators for vulcanizing rubber is attended with great difficulties in practice because of the tendency of mixtures of rubber, sulphur and accelerator to vulcanize fairly rapidly at temperatures low enough to be reached during operations such as calendering and tubing. When this occurs, further handling is impossible, or at least it becomes difficult to utilize the scrap over again.

A procedure has been devised which permits in many cases the use of ultra-accelerators with all their advantages, without encountering any difficulties. The principle of this process consists in the preparation of the mixture of rubber and accelerator without sulphur, and subsequently treating with sulphur the outside surface of the sheets, tubes or other objects.

After having mixed the rubber with all the inert ingredients, the ultra-accelerator is added and the rubber article is made in the usual way. In all such work, care should be taken to keep the temperature relatively low to avoid any reaction of the accelerator. Finally the object is brushed over with finely divided sulphur, or with a suitable mixture of sulphur and an inert powder, and is placed in a chamber at 50-60° C.

Under these conditions, the sulphur diffuses easily into the interior and an optimum cure is attained in a period of time varying with the temperature, with the percentage of accelerator and with the thickness of the article.

The presence of an excess or a variable amount of sulphur on the surface has no harmful effect, or rather does not cause over-vulcanization or variations in the state of cure, even when the time of heating is prolonged. This is due to the fact that the amount of sulphur combined, and consequently the state of cure, is governed by the quantity of accelerator in the mixture. Such a condition constitutes another advantage of the method under discussion. In like manner, there is no danger of a variation in the cure at different points on the surface.

By this process, sheets and articles of rubber up to several millimeters thickness can be vulcanized successfully.

The process has been in successful operation since December, 1918 at the Milan works of the Pirelli Society.

Translated from the Italian Giornale di Chimica Industriale ed Applicata, Vol. 5, No. 1, Jan. 1923, page 15. By C. C. Davis.

The Colloid Chemistry of Rubber

By Ismar Ginsberg, B.Sc., Chem. Eng.

The study of colloids is that of extremely finely divided material in a state of suspension in other materials. Colloid chemistry, as such, has been given much attention in the past twenty years and the rubber industry has not been overlooked.
Today we live colloidal lives—our food and our drinks are colloidal. We live in colloidal houses and ride on colloidal tires on colloidal asphalt or cement streets. Knowledge of colloidal chemistry is solving many problems of industry, not only in the rubber industry but in the food, steel, dyeing and many other fields too numerous to mention. (EDITOR)

ONLY within the last decade the principles of colloid chemistry have shown themselves to be pregnant with important consequences to industrial processes. For a long time colloid chemistry was a mere highly scientific fad of the chemist who liked to delve into the theoretical and mathematical side of chemistry. But within the last few years it has been proven by actual experience in the factory and mill that the proper understanding of the principles of colloid chemistry, as they affect the processes being applied therein, can prove of great commercial importance and decided economic advantage to the mill man who is able to apply theory to practice.

There are many chemical and allied industries, in which the processes used depend on certain changes and transformations that take place in the raw materials. These changes are of a colloidal nature. In the past these processes have been carried out in many cases on the rule-of-thumb principle and the very reason of the difficulty of putting the process on a scientific basis, so that the desired result could be obtained each and every time the process was operated and at the best efficiency, was that colloid chemical principles were involved which were not thoroughly understood. Of all these industries there is perhaps none in which colloid chemistry plays such an important role, in which a more perfect colloid is dealt with not only in the state of raw material, but also in the intermediate and final product, as the rubber industry.

All States of Colloid Found in Rubber

For the sap that comes from the rubber tree is in the colloidal condition; so is the crude rubber that is coagulated from that sap or latex by the addition of acids, etc., and so in a certain sense is the final vulcanized product that is obtained from the crude rubber. The application of the principles of colloid chemistry to the rubber industry starts right at the production and preparation of the latex. The rubber latex coagulates and is converted into a solid mass due to the precipitation of the colloid, caoutchouc, which is present in the latex as a hydrocarbon, a combination of hydrogen and carbon, possessing the approximate formula $(C_5H_8)_n$.

The rubber latex really consists of about 30 to 35 per cent of globules of caoutchouc, which are surrounded by an enveloping medium, which consists mainly of albumen, resins and organic compounds of all sorts. There is about five per cent of these materials present in the latex, the whole mass being suspended in water. The albumen plays an important role in the rubber latex and also in determining the quality of the crude rubber which is prepared from it. When various coagulating agents are added to the rubber latex, the albumen is coagulated and carries the rubber globules along with it. Just how much of the albumen and other nitrogen containing substances in the rubber latex is carried along with the rubber and distributed through the crude rubber mass as a network of protein films or fibrils, which are not penetrable to organic solvents, is determined by the nature of the coagulants. This is an important consideration, especially when the subsequent manufacturing process is concerned with the solution of the rubber in organic solvents.

Some rubber manufacturers may have noticed that crepe rubber behaves differently than plantation rubber when immersed in an organic solvent. This is due to the fact that the crepeing machine breaks up this network of insoluble, impervious nitrogenous films and allows the solvents to get at the rubber. It has also been found that sheet rubber containing the films intact swells more and retains its shape better than crepe rubber.

It is thus clear that the coagulation of the latex will produce different results when carried out under different conditions. This fact was only realized when the problem was attacked from the colloidal chemical standpoint. The quality of the crude rubber, the toughness of the coagulated mass of caoutchouc and albumen, is an important factor, for the rubber manufacturer cannot make a good vulcanized rubber from a poor grade crude rubber. It is now understood that the percentage of albumen present in the rubber and the manner in which it exists therein, which is determined by the character of the coagulant and the process of coagulation, has a great effect on the properties of the crude rubber produced and on the uses to which it is to be put.

If it is desirous to obtain a crude rubber that dissolves slowly in the solvent, then the rubber latex should be coagulated with a mixture of tannin and acetic acid. Even crepe rubber, made in this manner, will hold together for a long time when immersed in solvents.

Properties of Crude Rubber and Method of Coagulation

The strength or toughness of the crude rubber is affected to a marked degree by manner in which the rubber colloid is changed from the sol to the gel state. For the process and the kind of coagulant used affects the proportion of albumen that is contained in the raw rubber which also has an effect on the toughness of the same. It must also be remembered that the strength of rubber is directly connected with the viscosity of the solutions made with it. When the strength is little, the viscosity is low. Vulcanized articles made from such rubber are easily decomposed by heat and are particularly sensitive to the action of light. The light soon causes the rubber to harden and crumble away.

It should not be forgotten that the rubber latex obtained from different rubber plants varies considerably in quality, properties and value of rubber produced from them. This is due mainly to the colloidal condition of the rubber latex. Thus the rubber latex from the Hevea tree—Para rubber—contains the rubber globules in a very fine state of sub-division. The latex from the Rambong and also that from the Castilloa tree contain much larger particles of rubber globules. Such latexes give rubbers which do not dissolve in rubber solvents to give as viscuous solutions as when Para rubber is dissolved. The same condition applies to inferior "wild" and "scrap" rubbers. Furthermore the Para latex is much thicker than the others and is much more difficult to coagulate. The coagulated Para rubber is also much easier to vulcanize than the Castilloa rubber. All these facts depend on the colloidal properties of the rubber latex and the proper understanding and appreciation of the same in their relation

to subsequent rubber manufacture was possible only after the theoretical principles of colloid chemistry were thoroughly comprehended.

Colloid Chemistry and the Vulcanization of Rubber

The most important process that is carried out in the rubber industry is the vulcanization of rubber. Just exactly what happens in this process is still not known. It is of course well-known that the sulphur combines in part with the rubber molecule and converts the latter into a product which possesses certain peculiarly advantageous properties that are not found in the original crude rubber, but just what the composition of this product is, is still a matter to be determined. Within the past few years, cold vulcanization has been developed into an important commercial process, and various substances have been discovered which possess the property of increasing the rate of the vulcanization and the temperature at which the process takes place. Some of these substances are known as accelerators and others as ultra-accelerators. Thus, from a simple hot vulcanization process, which was the only method used in rubber mills for many years, an entire series of new processes have been evolved. It is clear that the proper understanding of the mechanism of the vulcanization process has become even of greater importance than formerly, and it is safe to say that here again colloid chemistry plays an essential and determinative role.

Does Sulphur Combine or is it Absorbed?

There are of course different theories held about the vulcanization process. Some hold that the process is a pure chemical combination of the rubber and sulphur; others that the sulphur is absorbed by the rubber through colloidal adsorption. It is probable that what happens is a combination of the two phenomena. It is known that part of the sulphur, that is present in vulcanized rubber can be dissolved out directly with the aid of solvents. This is called the free sulphur. Then there is the combined sulphur which cannot be extracted in this manner. It is, however, possible to extract small amounts of this sulphur by prolonged treatment with solvents. This fact would tend to indicate that the sulphur was present in the rubber in two different conditions and that both chemical and colloidal reactions take place when rubber is vulcanized.

It is a well understood fact that chemical changes in a substance produce new substances of entirely new properties. When crude rubber is compared with vulcanized rubber, it is apparent at once that different materials are being examined. This difference is accentuated when hard rubber is compared with the crude product. The crude rubber, by being heated with sulphur, has lost its plasticity, but not its elasticity. It cannot be worked between the rolls. Hard rubber can be ground up into a powder. Furthermore the vulcanized product has become more resistant to the effects of light, air and heat.

Hard Rubber

Hard rubber is made by using more sulphur in the rubber mixture and prolonging the time of vulcanization. Whether or not the formation of hard rubber is due to the formation of saturated solutions of sulphur in rubber or whether it is due to the more complete combination of the sulphur with the rubber molecule is a matter of opinion. It is a fact that it is much more difficult to remove the sulphur from the vulcanized hard rubber. Here again it is probable that the rubber molecule combines with more sulphur and at the same time there is more sulphur absorbed by the rubber mass. The formula for the rubber sulphide, that it is believed is formed in the vulcanization process, may be written as $C_5H_8.S$ or $C_{10}H_{16}.S_2$. There is probably no more than a maximum of 10 per cent of the sulphide present in the soft vulcanized rubber. There is more of the sulphide present in hard vulcanized rubber. In this connection it must be pointed out that the vulcanization process is irreversible, and that the various resins, waxes and proteins that are present in the crude rubber as impurities undoubtedly have some potent effect on the quality and properties of the vulcanized product. Just what this effect is, is not known, but that such an effect does exist may be concluded from the fact that certain kinds of rubber vulcanize more readily than others and that the essential difference between these various types of rubber is their content of waxes, fatty matters, resins, etc.

Changes in Rubber During Mastication

While rubber is being masticated between rollers, a change takes place in its physical state and its colloidal properties are somewhat altered. For example certain mechanical properties of the rubber, such as strength and hardness are affected by this treatment. As the mastication process proceeds the rubber becomes stronger and harder but after a certain point is reached a reaction takes place and rubber becomes less strong and less hard. The action is consequently reversible to a certain degree and its reversibility is due to the colloidal properties of the rubber. When the mastication is continued too long, as every rubber maker knows, bad results are obtained in the subsequent vulcanization. Rubber articles made from such rubber age rapidly. The colloidal equilibrium within the rubber mass is destroyed by such treatment with consequent bad results.

Acceleration of Vulcanization. Effects of Catalysts

Vulcanization is accelerated by the use of certain catalysts, either of organic or inorganic origin. These catalysts cause a change in the colloidal condition of the rubber to take place at accelerated speed. Various advantages are gained in increased strength and durability of the vulcanized product. The exact mechanism of the accelerated vulcanization process is still unknown. It is even uncertain that these vulcanization accelerators can be accurately termed catalysts, for while they effect their action when present in small proportions, nevertheless, they are subject to decomposition and chemical change during the vulcanization process, and similarly they do not exhibit the ordinary "poisoning" effects to which true catalysts are subject. The whole subject of accelerated vulcanization is one that still requires scientific and thorough investigation from the colloidal-chemical standpoint before all the possible benefits of the accelerators can be realized.

Colloid Chemistry and Mineral Fillers

In investigating the effects of mineral fillers on the compounded rubber and the best condition under which these substances can be used to yield a product of the highest quality, it has been found that the problem is again one of colloidal chemistry. When these fillers are added in the proper amount and in the proper state of sub-division a very marked improvement in the mechanical properties of the rubber mass is observed. The determinative consideration appears to be the size of the particles of the mineral fillers. There is probably no chemical action at all that takes place when they are added to the rubber mass, but it is easy to see that when these fillers are used in a degree of fineness approaching colloidal condition most effective incorporation with the rubber mass is secured and the best quality of rubber product is obtained.

Cold Vulcanization of Rubber

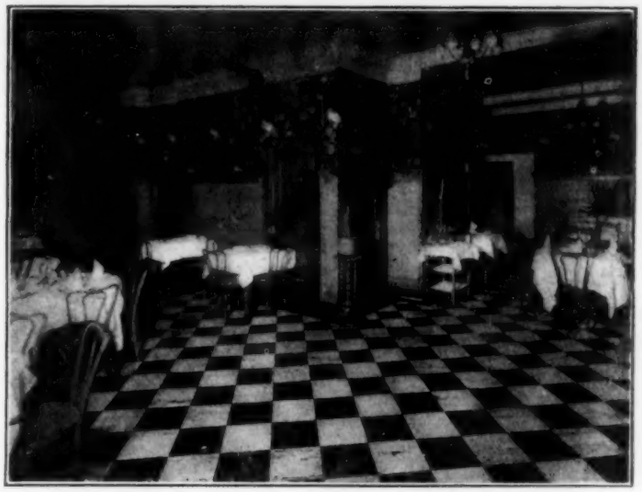
Colloidal processes are of paramount importance in the cold vulcanization of rubber as well as in hot vulcanization. It is known that the use of sulphur chloride will vulcanize rubber so rapidly that the vulcanizing agent cannot be incorporated into the rubber mass; there is no time for this. Consequently the vulcanizing agent is dissolved in carbon disulphide or in another solvent such as benzine or chloroform, which causes the rubber gel to swell. This is an important feature of the process, for the greater the degree of swelling, the more of the sulphur chloride is absorbed by the rubber mass and the more thorough the vulcanization.

Conclusions

There are still other changes that take place in rubber manufacture that depend on colloidal chemical principles for their proper explanation and understanding. There is the entire field of synthetic rubber and that of gaseous vulcanization by the Peachey process. In fact whenever a chemical change is effected in the rubber mass, colloid chemistry is concerned. There are many phases of this subject that still remain open for investigation along colloid chemical lines.

The Market for Rubber Tiling

Rubber tiling has certain qualifications that make its use universal. Hospitals, banks, restaurants, office buildings, ferry boats, steamships, private dwellings, banks, schools—are now using rubber for flooring purposes.



Stedman Products Co.
RUBBER TILING FOR RESTAURANTS

RUBBER tiling is coming into a more universal use, but by no means is it used as extensively as it should be. Consider the fact that it has been on the market for about thirty years; consider its marked advantages over many other types of flooring, and it appears that a volume of sales of between $3,000,000 and $4,000,000 in 1922 shows that rubber manufacturers have not "sold" architects, builders and owners on the advisability of using their product in place of wood, cement or linoleum flooring.

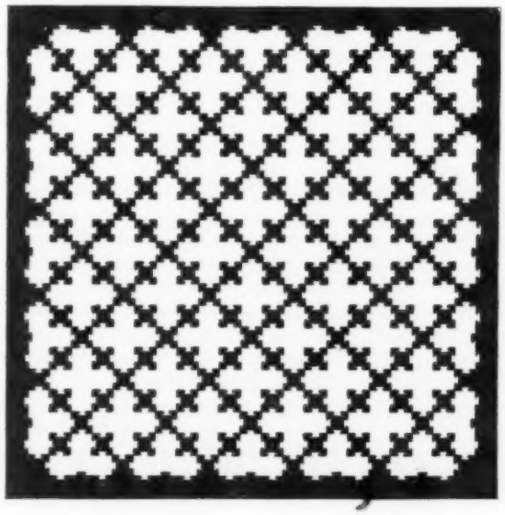
The large number of installations of rubber tiling which have given twenty or more years of service under hard usage are evidence of the value of this type of flooring. With that as a selling point have the manufacturers endeavored to obtain the proper amount of publicity? Have they interested the architect and the ultimate user through the proper media, such as building trade papers, catalogues (as Sweet's), or through their own catalogues sent to prospects?

It has been shown that certain classes of buildings have adopted and are using rubber flooring, but there are a number of additional outlets that should be looked into for probable development. Hospitals, public institutions, as schools and theatres, churches, banks and office buildings, etc., have used rubber tiling to advantage for years. Yet the modest home—small in the separate item, yet large in floor area in the yearly aggregate—has been somewhat slighted, a building expert asserts. Then, there are those portions of factories where workers have to stand continually as around machinery and in testing laboratories where rubber tiling could be used.

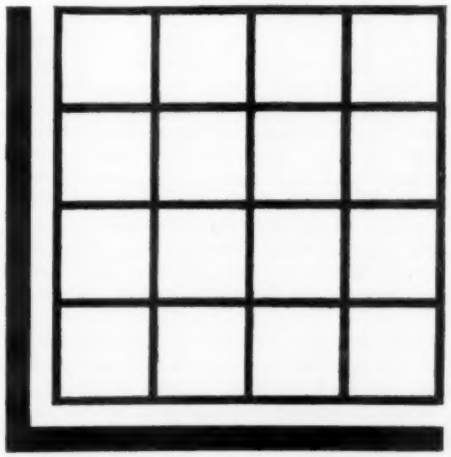
Take the home for instance. In 1923 there will be, according to conservative estimates, about 1,200,000 new homes built. Rubber tiling can be used to advantage in the kitchen, bathroom, vestibule, nursery, sun and sewing rooms, etc., with an approximate floor area in each home of 500 square feet, or a total in all new homes under construction of 600,000,000 square feet. This is a worth while market which can be reached through building trade papers and the more popular building and home decoration magazines that go direct to the home owner. The existing market in homes is of course left untouched, but in no way, taking the above figures into consideration, should that market be minimized or overlooked.

The other classes of buildings considered as prospects for rubber tiling, and which offer an additional 100,000,000 square feet of flooring for the year 1923 are: Hospitals and institutions, 350 buildings with floor area of 8,000,000 square feet; 750 churches with 6,000,000 square feet and 10,000 business buildings with 75,000,000 square feet. Add to this 50,000,000 square feet as the approximate area of the factory market, and a like amount for stores, automobiles, railroads, steamships, and it is found that there is a total floor area of 800,000,000 square feet which can be considered as a fertile field for development this year.

But the demand for rubber tiling is steadily increasing. In 1922 between $3,000,000 and $4,000,000 of rubber floor



N. Y. Belting & Packing Co.
SHOWING INTERLOCKING TILE



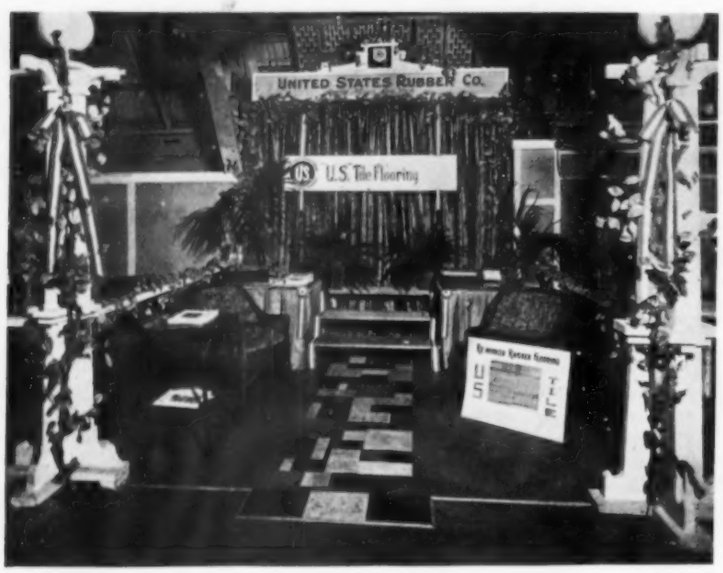
N. Y. Belting & Packing Co.
SHOWING NEW SQUARE TILING

tiling was sold. One manufacturer who sold 150,000 square feet of rubber tiling in 1922 reports that he has a possible demand for 500,000 square feet of the material this year. Manufacturers, of course, decline to make any predictions regarding the volume of sales for 1923. They, however, feel that this year will bring a larger volume of business than last.

Should a market with this breadth and width be overlooked? Doesn't this offer, in part, an opportunity for the rubber industry to develop an old branch of its operations into one worthy of serious thought and action?

has been used continuously for twenty-five or thirty years, and is still rendering satisfactory service.

The American Hospital Association highly recommends the installation of rubber floors, giving this class of flooring an A rating for abrasion, pressure, fire, staining, and a B rating for acid and alkali. The association, furthermore, reports that "there is no definite objection to the soft-type of flooring in that it has not the durability of some of the other types. **** There has been a development in this type of flooring that has retained all of the advantages of the former group



U. S. Rubber Co.

EXHIBIT OF RUBBER TILING AT RECENT CONVENTION OF NATIONAL RESTAURANT ASSOCIATION

Stedman Products Co.

AS USED IN PANTRIES

History of Rubber Tiling*

Although it is only during late years that the use of rubber as a floor covering or flooring material has been anywhere near general, the idea is not by any means new. Thomas Hancock in his personal narrative relating the early trials of the rubber industry refers to a patent which he took out in the year 1846 for such an item of rubber manufacture. In fact, in his book, the Government patent file itself is quoted and the patent number given thus anticipating any doubt which might otherwise arise as to the authenticity of the invention.

Development of rubber matting has, therefore, extended back for a period of more than seventy years beginning with about 1846. But, rubber tiling, we are told, was the idea of Charles Goodyear, who after taking out his patent for the process of vulcanization, experimented with, among other things, rubber tiles for floors which he hoped to make as brilliant in color as those of mineral, as agreeable to the tread as a carpet and as durable as the ancient floor of oak. Little did Goodyear think then that the time would come when rubber tiling would be recognized as the most satisfactory and durable flooring material manufactured. The first tiling was, however, of the square block and Mosaic designs; the interlocking variety not having come into existence until several years later; or at the time the New York Belting and Packing Company purchased the patent and started its manufacture.

The B. F. Goodrich Company began the manufacture of mats and matting about 1897 and a few years later at the expiration of the New York Belting and Packing Company's patent it added interlocking tiling to its line.

One of the principal characteristics of rubber tiling is its durability. In many instances this type of flooring has been subjected to unusual wear. In a number of cases this flooring of soft floors, at the same time it has overcome the objection of pitting, and seems to offer a resistance to abrasion which compares favorably with the hard types of flooring."

Most companies have their own particular method of manufacturing rubber tiling. In general the flooring is made by compounding a high grade of rubber with sufficient resiliency to yield slightly under foot. The mixture may contain the following substances: Congo rubber, pontianac, acera flake, white reclaim, white substitute, zinc oxide, barytes, whiting, sulphur, lime, drab rubber waste, drab reclaim and resin oil. Furthermore special attention should be given to the process of mixing.* "It should be seen that the compounds are thoroughly mixed together, as if streaky at all the tiles when finished will have a very bad appearance. In the majority of cases the tiles are punched out from a sheet of uncured rubber, the thickness of which should be a little more than the finished product. Where the business in tiles is continuous, the punching is done on a machine—similar to that employed for punching out rubber heels. In many cases the rubber tiles have a canvas or hessian back, and this is, of course, vulcanized on and then stripped off. It provides a good rough surface, and the solution with which the tiles are laid obtains a firmer hold than if it were a smooth surface.

"If it is possible and conditions allow, it is advisable to fill the press with molds of the same thickness, although they need not be of the same design. This all makes for economical production and permits of tiling being cheaply done."

Manufacturers point out that the flooring of the concourse of the Hudson Terminal Building on Cortland Street, New York City, is covered with rubber tiling. In spite of the wear and tear that this floor is subjected to it is as yet showing no signs of deterioration. Some of the ferry boats of the Pennsylvania Railroad, plying between New York and Jersey

*Abstracted from "Rubber In Industry"—The B. F. Goodrich Co. 1918.

*India-Rubber Goods Manufacture, published by MacLaren & Sons, Ltd., 1920.

cities, have been floored with this tile for the past twenty-five years, and the flooring of some of the older boats that were originally covered with rubber tiling, are still in excellent condition. Other prominent places where the durability of rubber tiling is thoroughly tested is the Empire Building, 71 Broadway, the Knox Hat Store at 41st Street and Fifth Avenue, and a medalion in front of the B. F. Goodrich Rubber Company's office in New York City. In the case of the Knox Hat store the installation was made fully twenty years ago, and the flooring there is still in good condition.

But rubber tiling has other advantages, some of which are: It is sanitary and is easily cleaned by mopping with cleaning powder and water. The floors are practically noiseless, due to the yielding of rubber under foot. This characteristic of rubber tiling makes it especially adaptable for use in hospitals where silence is most needed. The fact that the tiling also possesses a certain amount of resiliency also recommends it as the ideal floor where workers must stand. The flooring, furthermore, does not stain which fact is accounted for by the non-absorbent nature of rubber, while it also gives a safe foot hold because of its non-slipping surface.

Thus far the market for rubber tiling has been confined mostly to steamships, office and public buildings, passenger coaches, restaurants, hospitals, elevators, automobile display rooms, while a marbleized tile is frequently used in banks and hotel lobbies.

Chicago and New York are the two biggest markets for this product. Recently the better class of architects have been recommending the use of rubber tiling in the bath rooms and kitchens of homes. The future market for rubber tiling, however, greatly depends upon the salesmen who are selling this material. The salesman must first of all sell the architect, and if he is successful there the architect will recommend its installation to the builder who in turn will tell the owners about it. For a number of years builders have frowned upon the use of rubber tiling. Besides the builder and architect there are other competitors that the rubber tile manufacturers must cope with. They are the substitutes for rubber tiling such as cork linoleum, rubberized linoleum. That type of tiling can be produced at a lower cost, but still it does not render the service that rubber tiling does.

From a dollar and cent stand point these floors have another advantage. They may be laid over existing wooden floors with very little preparation. The laying calls for no structural alteration, nor expensive labor. As one manufacturer put it: "Rubber tiling is sold so that it can be laid by the purchaser." When laid and finished off with a border strip, the effect is just the same as the most extravagant stone or marble-tiled floor. But the cost, in comparison with the stone or marble-tiled floor, is only fractional.

Care, however, should be taken in laying rubber tiling. First of all it will not adhere if the floor is wet or damp. The floor in all cases must be absolutely dry. After the floor has been laid it should be washed, laid in a tiling cement, the constituents of which may be pontianac, tar, pitch, resin oil, benzene and whiting or with a tiling cement made up of raw rubber, good reclaimed rubber, boiled linseed oil, best resin, white lead, resin oil and benzene.

"Another factor which counts to a great extent is the time taken for vulcanization, which should be as short as possible, say between fifteen or twenty minutes. This would enable the men to be preparing a further set of molds to go into the press immediately after the others came out, and this, of course, means economy in steam, as well as labor."

Rubber flooring sometimes comes in rolls, and it is possible to obtain this kind of floor covering of good quality at a price even lower than one would have to give for an inlaid linoleum of equivalent quality. The sheet rubber type is made in varying widths, and may be laid in one piece across the width or length of a room in exactly the same way as ordinary linoleum.

Should a section of rubber tiling be damaged it can easily be replaced. This is done by removing the broken square, and by inserting a new section. The repairing can be done without disturbing the remainder of the flooring. At any time any section of the floor can be taken up to get at pipes or wires underneath, and can be replaced after such repairs are made.

There are two types of rubber tiling on the market at present. One type is the interlocking tile, the kind that has been used for the past twenty-five or thirty years. Some objection has been raised to the looks of the interlocking style, and consequently a square form of tile has recently been introduced and which can be laid in geometrical shapes. The primary difference in the two forms is one of appearance. There is also made an inlaid tiling in sheet form with any design and any combination of colors.

The Stedman Products Company, New York City, is turning out a flooring called "naturized flooring." This kind of flooring is made of rubber, reinforced with an infinite cobweb of minute gossamer cotton fibers, vulcanized under hydraulic pressure. It is made in both marble and tapestry effects. In many instances the Stedman floors have served for a period of twelve years without showing any perceptible signs of wearing, while the Bonded Floors Company, which recently took over the tile business of the Goodyear Rubber Company assures the buyer of the wearing qualities of rubber flooring by giving him a five year guarantee in the form of a bond. All of this naturally sustains the contention that rubber flooring wears as well as, if not better than, other types of flooring.

Sowing today for future harvests is an undertaking that sometimes carries a penalty with it. But thirty years ago rubber tiling made its appearance in the United States, being introduced by the New York Belting and Packing Co. That company was the first to manufacture the interlocking type on an extensive scale, having purchased the patent rights from a Philadelphia architect. In spite of their thirty years of service many of this company's original installments are rendering satisfactory service today.

Polish Market for Rubber Footwear

Due to climatic conditions, the Polish market for rubber galoshes is large, considering the purchasing power of the people. In view of the extreme depreciation of the Polish mark, the good sales of Swedish galoshes (notably the Tretorn brand) at prices fully equal to if not exceeding American levels was a feature during the past winter. It is to be noted that where the above brand is for relatively unattractive and heavy models, the workmanship and materials are of the best, and each shoe carries a two-year replacement guaranty. The competition during the winter was chiefly from German and British makes of inferior quality, offered at materially lower prices. The success of the Tretorn products was probably due to a personally conducted sales and advertising campaign, while other makes were pushed only by correspondence.

Commercial Attache H. B. Smith, Warsaw, February 26.

Alaskan Rubber Goods Market

There is not sufficient tire business in Alaska to warrant a company sending exclusive tire salesmen there, although a number of jobbing houses in Seattle, Wash., send salesmen to Alaska who handle tires and rubber footwear among other lines. Juneau is the best point from which to reach the interior and some towns along the coast. Shipping is open throughout the year from Seattle to coast cities as far as Seward. Seattle has been a satisfactory distributing point on account of transportation and the short shipping season for a large portion of Alaska. Exports of rubber goods from the United States to Alaska in 1922 were belting, hose, and packing, $100,031; automobile tires, $22,349; all other tires, $2,764; rubber boots and shoes, 87,180 pairs, valued at $222,176; and all other rubber manufactures, $20,643.

Shirl H. Blalock, District Manager, Seattle.

ABSTRACTS

Technical — General — Commercial

Rubber Composition

A composition which is suitable for the manufacture of molded insulators by the vulcanization process consists of the following ingredients, rubber 25 parts or less, siliceous earth 60 parts or more glue-sized mica 5 parts, milk of lime 2 parts and sulphur 8 parts. (United States Patent No. 1,440,455.)

Plastic Waterproofing Material

A binding and waterproofing material of plastic characteristics and a process of making the same are discussed in United States Patent No. 1,431,455. The material comprises a natural vulcanizable gum which is combined with sufficient cellulose xanthate to furnish the necessary sulphur to secure the desired degrees of vulcanization. Inorganic and organic filling materials may be added.

Puncture Sealing Composition

The French firm of Societe J. Houdry et Fils have been granted British Patent No. 187,594 on the preparation of a composition to be used for sealing punctures in rubber tires. The action of this sealing composition is automatic. It consists of a mixture of a substance which has cellulose as a base, a basic solution and a weak acid. This mixture may then be compounded with asbestos, kieselguhr, antiseptic and coloring matters. Suitable ingredients and proportions are as follows: bran 30 parts, sodium carbonate 2.1 parts, salicylic acid 5.4 parts, asbestos 36 parts, kieselguhr 4 parts. All these substances are figured in kilograms. To these there are added 2.5 liters of saprocresol, 500 cubic centimeters of turpentine, 150 grams of creosote, 50 grams of Soudan red, 40 liters of alcohol and enough water to make the entire mixture up to a volume of 600 liters. The bran is first boiled with a little water and the soda solution is added, and then the other ingredients are mixed in with constant kneading until a homogeneous product is obtained. The salicylic acid may be replaced with dilute hydrochloric acid.

Adhesive Tape

A new method of making adhesive tape is patented in British Patent No. 180,408, which is assigned to the Callender's Cable and Construction Co. Ltd. The adhesive ribbon or tissue is obtained by treating the two surfaces of the textile material with plastic substances, preferably with rubber, which is combined with ingredients which render one surface adhesive and the other surface non-adhesive. The non-adhesive coating can be made from a mixture containing non-vulcanized rubber mixed with resinous rubber and organic or mineral loading materials, or from plantation rubber, liana rubber, guayule, pontianac, balata or gutta-percha, mixed with gums, resins, mineral soaps with or without loading materials. The adhesive coating can be made from a composition containing natural rubber, which has been softened up by a prolonged working between rollers, or else which has been rendered decidedly sticky by admixture of a certain proportion of organic materials such as strongly resinous rubber, oils, tars, fats, etc., or it can be made fram a composition containing plantation rubber, which has been incorporated with wild rubber or with oils, petroleum pitches, distillates obtained from wood and loading materials such as oxide of zinc, barytes, etc. Boric acid may be added. It serves as an antiseptic.

Spongy Rubber

The Standard Rubber Works Proprietary Ltd. of Melbourne, Australia, has secured a patent (United States Patent No. 1,422,884) on a method of making spongy rubber from the following mixture. 15 pounds of para rubber are mixed with 15 pounds of regenerated rubber, 13 pounds of sulphur, 9 pounds of zinc white and 1.5 pounds of carbonate of magnesium in the presence of a volatile mineral oil. The mass is thus softened materially. It is then subjected to vulcanization.

Vulcanization of Rubber in Solution

According to the experiments, which have been carried out by F. Boiry and described in *Comptes rendues*, volume 175, pages 102 to 104, when rubber is heated in solution in an organic solvent in admixture with sulphur at a temperature of about 120 degrees C, the nature of the product, that is obtained under these conditions, depends on the concentration of the solution and on the nature of the solvent that has been used. In the case of very dilute solutions, containing only one or two per cent of rubber, and when such solvents as nitrobenzene, gasoline, phenetrol, etc. are used, there is obtained a gelatinous deposit, which in the dry state has the appearance of a hard elastic substance with a black fracture. After extraction with acetone it contains about 15 to 30 per cent of "combined" sulphur, according to conditions.

When such solvents as aniline, xylene, thymol, etc. are used, no precipitation is obtained even when the solutions are boiled for several weeks. In the case of concentrated solutions, containing as much as 10 per cent rubber, when the solvents of the first class are used, the viscosity of the solution is diminished at first by heating until it reaches a minimum point; then it increases slowly, finally more rapidly until the liquid is changed into a gel. These gels show the phenomenon of syneresis. The content of sulphur in the products obtained after the extraction of the gels with acetone is from 20 to 30 per cent.

Preserving the Elasticity of Rubber

From a study of the different conditions that effect the properties of vulcanized rubber, it has been possible to derive the following important conclusions. In the first place it has been found that basic compounds are able to disperse the rubber colloid. The volatile bases produce a dispersion, which does not return to the state of aggregation or gel unless the bases are evaporated very slowly from the rubber mass. The less volatile the base, the more favorable the action on the rubber colloid and the longer is its influence felt in the successive transformation of the rubber colloid from the state of a dispersion to the gel state, the elasticity and the original properties of the rubber are generally maintained intact. The elasticity of rubber can be conserved artificially by stimulation of its dispersive power (that is, its power to remain in the condition of a colloidal sol, solution) by means of the addition of basic compositions. As rubber is a negative colloid, it remains in the colloidal condition for a very long time in the presence of basic compounds. The presence of these compounds, for example aniline, not only accelerates the vulcanization by increasing the dispersion of the rubber colloid, which facilitates the absorption of the sulphur, but it also increases the total life of the vulcanized rubber article by conserving the rubber in its colloidal condition. (*Zeitschrift fuer angewandte Chemie, 1922.*).

Rubber Prepared with Sodium Silico-Fluoride

Rubber, that is prepared with sodium silico-fluoride, possesses good keeping qualities. An accelerated aging test, which was made at a temperature of 70 degrees C with rings of vulcanized rubber, in the original preparations of which sodium silico-fluoride was used, indicated that the aging behavior was satisfactory.

H. P. Stevens in the *Bulletin of the Rubber Growers' Association* describes these tests as well as a modified method of the application of sodium silico-fluoride in the preparation of the rubber. (see volume 4 pages 591 to 593). The unwashed smoked sheet, which is prepared with sodium silico-fluoride, offers great resistance to the growth of mold. However, when the treated sheet is subjected to the regular after-treatment, consisting of washing, brushing and re-drying of the sheets after smoking, the effectiveness of the sodium solico-fluoride treatment may be considerably reduced. Differences were also remarked in the vulcanization tests of sodium silico-fluoride treated rubber in comparison with the ordinary rubber coagulated with acetic acid. Among other things it was noticed that the former rubber vulcanized about 10 per cent more slowly than the latter. It was also observed that variation of the proportion of sodium silico-fluoride used in the treatment of the raw rubber latex between 1.5 grams and 40. grams per 3000 cubic centimeters of the rubber latex had but little effect on the rate of the subsequent vulcanization.

Acceleration of Vulcanization by Cinchona Alkaloids

An investigation was made to determine the effect the various alkaloids in cinchona bark, such as quinine, cinchonine, cinchonidine, etc., had on the vulcanization of rubber. A description of the tests and the results obtained is found in the *Journal of the Society of Chemical Industry*, 1922, 374T to 376T. The accelerators were dissolved in alcohol to form a 20 per cent solution. Different volumes of the solution were then allowed to drip on the raw rubber in the form of crepe. The samples of rubber, treated in this manner were left exposed on glass plates until the alcohol had completely evaporated. A test was made on rubber treated with alcohol alone, which was found to vulcanize at the same rate as a control sample, showing that the alcohol had no effect on the vulcanization.

The results obtained may be summarized as follows. All the cinchona alkaloidal bases, quinine, cinchonine, cinchonidine and quinoidine are fairly powerful accelerators. The first three appear about identical in their accelerating effect. Quinoidine is not as powerful as the other three. The addition of zinc oxide accelerates the rate of vulcanization of all the samples.

Old Rubber Used for Belt Dressing and Pulley Cover

A patent has been issued recently on a process of making belt dressings and pulley covers from old rubber. The rubber is worked up into the form of composition and this composition can also be used as a friction surface dressing for brake bands, pulleys, clutches, etc. The composition is made from old rubber, such as the inner tubes of automobile tires and the like. The material is first cut up into small pieces and then heated in an ordinary kettle to the proper temperature. The rubber is reduced to the liquid condition by the heat. It has been found that it is preferable to use old rubber, which has been subjected to an oxidation action of more or less severity by exposure to the air, for a better product is obtained from this material. It has also been found that old rubber, which contains such substances as zinc oxide, sulphate of barium, lampblack, etc. gives good results.

The process of fusion produces a thick, heavy liquid substance, which is no longer rubber, but which is of very heavy consistency. This substance is highly adhesive, waterproofing in nature and capable of adhering strongly to surfaces and of forming a frictional coating thereon.

Rubber from Sprayed Latex

The new process of obtaining rubber from sprayed latex, which has been introduced into this country, is discussed by H. P. Stevens in the *Bull. Rubber Growers' Association*, 1923, 5, 41-8. It was found that the increase in the yield of rubber from 8 to 17 per cent is due largely to the retention of soluble serum substances which do not increase the value of the product. It was also found that comparative mixtures of sprayed and coagulated rubber when vulcanized gave results, demonstrating the higher tensile strength of the latter. The difference between sprayed rubber and ordinary plantation rubber with respect to retained solids from the serum is parallel, although existing in a more marked degree, to that between sheet and crepe rubber. This comparison gives no justification for the claim that sprayed rubber is superior. Sprayed rubber when creped resembles ordinary crepe rubber but is less transparent. In the air dried condition it retains from 2 to 3 per cent moisture as compared with about one half per cent retained by ordinary crepe rubber.

Natural and Artificial Aging of Rubber

Rubber articles age. The phenomenon of aging appears in the rubber after a certain length of time. The transformation, which takes place during the aging of the rubber, is so slow that in industrial work, where it is desirous to control this tendency of rubber by varying the conditions under which it is manufactured or the ingredients that are mixed with it, it is necessary to accelerate the aging process artificially in order to be able to make experiments. This consists in heating the sample of rubber in a constant temperature oven to 77 degrees C, while allowing a gentle current of dry air to pass through the apparatus. In an article printed in the Giornale Chimica Industr, Applicata Dr. Pelizzola of the Pirelli Rubber Co. of Italy attributed the aging of rubber to the oxidation of the same, which results in the formation of various products, among which may be mentioned aldehyde and levulinic acid.

In the article of which this is an abstract, (see *Giorn. Chim. Industr. Appl.* volume 4, pages 458-460) the same investigator describes a series of experiments which were made for the purpose of establishing the chemical changes that take place in the artificial acceleration of the aging process. It was found that both the chemical and physical chemical changes that take place during accelerated aging are of the same character as those that take place during regular aging.

Regenerating Old Rubber

German Patent No. 351,785 has been assigned to the Plauson Forschungsinstitut G.m.b.H. on a process of regenerating old rubber. There are in reality three processes, forming three separate parts of this patent. The first process is for the regeneration of all sorts of old rubber. The old waste rubber, either hard or soft, is ground up in the Plauson mill and converted into the emulsified condition in the presence of a suitable emulsifying medium such as water. The operation is carried out at a temperature of approximately 110 degrees C. The waste rubber is desulphurized by this treatment and the regenerated rubber is then separated from the liquid in the regular manner. A modification of this process consists of the following proceedure. The old rubber, mixed with fibers or paper, is ground up in the colloid mill in the presence of caustic alkali or with a 30 per cent chloride of zinc solution until dissolution of the cellulose materials is accomplished. The rubber mass remaining is then filtered and treated in the same manner as in the first process. The third process is also a modification of the first. The old rubber, mixed with small proportions of solvents or with a liquid that possesses the property of hydrating the rubber or causing it to swell up, is subjected to a calendering process at a temperature between 100 and 110 degrees C until a homogeneous mass is obtained. The mixture is then treated in accordance with the first process described above.

MARKETS

Cottons and Fabrics

NEW YORK, MAY 18, 1923

The cotton market during the two weeks past showed itself to be in sympathy with the general agitation against high prices. Some of the most severe breaks of the season took place and at one session July sold down over seven and a half dollars a bale. At the lowest figure reached during the period under review July contracts broke through 23¾ cents showing a loss of seven cents a pound inside of two months. Interests centers in the new crop and it is generally believed that there will be a good increase in acreage; from 10 to 12 per cent being the private estimates. The price movements of cotton from now on will follow closely the progress of the new crop.

Record Consumption in April

A sharp upturn in the market came with the Census Bureau's report on the activity of the spinning industry. Consumption of cotton during the month of April totalled 577,396 bales which was conspicuously large compared with other months. It was lower by 45,709 bales than March but there were two less working days in April than in March and the consumption loomed large compared with April last year when 443,509 bales were consumed and 419,247 in April 1921 as well as 566,944 in 1920. Total consumption thus far this season amounts to 5,040,004 bales compared with 4,446,723 bales during the same period of nine months last year, an increase this year of nearly 600,000 bales.

New Record For Consumption

The 577,396 bales consumed in April, which broke all records for daily average consumption, included 27,176 bales of Egyptian; 7,194 other foreign; 3,856 American Egyptian and 349 Sea Island.

Cotton on Hand

The total amount of cotton on hand in the United States on April 30 was only 3,855,659 bales and of this total 1,889,218 bales are in cotton consuming establishments and 1,966,441 in public storage and at compressors. Cotton in public storage has decreased 1,250,000 bales as compared with the amount in storage a year ago. Present stocks at the mills total 1,889,218 bales, against 2,034,535 bales on April 1. However, mill stocks only totalled 1,461,340 bales a year ago, 1,315,706 two years ago and 1,811,527 three years ago.

Stocks included 105,700 bales of Egyptian; 27,558 other foreign; 15,653 American Egyptian and 3,073 Sea Island. In consuming establishments there were 74,543 Egyptian; 20,298 other foreign; 23,806 American Egyptian and 4,379 Sea Island in public storage.

Active spindles totaled 35,515,791, compared with 35,500,518 a month ago and only 31,389,695 in April last year.

Cotton prices as of May 18 on the New York Cotton Exchange follow:

	Open.	High.	Low.	Close.	Prev. Close.
May	26.35	27.02	26.23	26.79@26.82	26.56
July	25.10	25.68	24.96	25.27@25.33	25.31
Oct.	23.00	23.31	22.93	22.97@22.99	23.24
Dec.	22.50	22.89	22.50	22.58@22.60	22.86
Jan.	22.25	22.67	22.25	22.27@22.28	22.55
March	22.25	22.60	22.25	22.27	22.57

EXTRA STAPLE COTTON

The extra staple cotton market was lower at the close of the period. Arizona—Egyptians are quoted, c. i. f. Boston, Ones, 37 cents; Twos, 36 cents. Foreign growths came lower with prices ex-store New York, as follows: Tangris strictly middling, 33½ cents; Mitafifi, high grade, 33 cents; Mitafifi, low grade, 31½ cents; Saks, medium grade, 34½ to 37 cents; Uppers, medium grade, 34 to 35 cents.

Strict middling cotton, classed as to staple on a very high standard is quoted as follows:

1 1/8 inch, 29½ to 30½ cents
1 3/16 inch, 31 to 32½ cents
1 1/4 inch, 33½ to 34½ cents
1 5/16 inch, 36 cents

EGYPTIAN COTTON

The Egyptian government's original estimate of the cotton crop for the season 1922-1923 was 4,004,000 cantars and was later revised to 4,900,000 cantars, whereas the crop will exceed 6,000,000 cantars. During the last few days the market for Egyptian, which had been very weak, turned upward in sympathy with the stronger position of domestic cotton. Boston quotations now show, Medium uppers, 31⅞ cents for No. 10; 31⅝ cents for No. 12; 31⅜ cents for No. 14.

TIRE FABRICS

There were more inquiries from tire manufacturers during the past week and the indications are that the tire trade will soon start to cover its later requirements for fabric. Prices are lower than they have been for months and the long dullness is expected to be broken by a new buying movement for July, August and September needs.

CORD FABRICS

Combed Sakellarides	.75	@	.80
Combed Peeler lb.	.70	@	.73
Carded Peeler lb.	.63	@	.65
Combed Egyptian uppers lb.	.70	@	.72
Carded Egyptian uppers lb.	.64	@	.68

SQUARE WOVEN

17¼-ounce Egyptian uppers, combed lb.	.68	@	.70
17¼-ounce Egyptian uppers, carded lb.	.62	@	.65
17¼-ounce Sakellarides, combed lb.	.72	@	.78
17¼-ounce Peeler, combed lb.	.70	@	.71
17¼-ounce Peeler, carded lb.	.61	@	.63

Sheetings—The market was dull and prices softened on most items as the raw material market declined. Sales of 40 inch, 3.60 yard, were made at 13¾ cents and 40 inch, 2.85 yard, at 15 cents.

Ducks—Quotations were lower and on the concessions there was good business noted in single filling and double filling. The lowered prices were a reflection of the raw cotton market.

Burlaps—Burlap prices tended decidedly downward during the period. Official import figures reported 52,800,000 yards, East coast, 10,200,000 yards, West coast and 3,200,000 yards Canada.

SHEETINGS

40-inch 2.50-yard yd.	.17½	@	—
40-inch 2.85-yard yd.	.15	@	—
40-inch 3.15-yard yd.	.16	@	—
40-inch 3.60-yard yd.	.13¾	@	—
40-inch 3.75-yard yd.	.11¾	@	—
40-inch 4.25-yard yd.	.10	@	—

DUCKS

Belting lb.	.44	@	.45
Hose lb.	.44	@	.45
Enameling lb.	.51	@	.56
Shoe Ducks lb.	.53	@	.55
Single filling lb.	.22	@	.23
Double filling lb.	.23½	@	.25

BURLAPS (Carload Lots)

7½-ounce 40-inch	5.45	@	5.50
8 -ounce 40-inch	5.55	@	5.65
10 -ounce 40-inch	7.05	@	7.10
10½-ounce 40-inch	7.15	@	7.25

DRILLS

37-inch 3.25-yard yd.	.13¾	@	—
37-inch 2.75-yard yd.	.15⅝	@	—
37-inch 3.00-yard yd.	.15	@	—
37-inch 3.50-yard yd.	.13½	@	—
37-inch 3.95-yard yd.	.11¾	@	—

OSNABURGS

30-inch 7-ounce	.16½	@	—
40-inch 7-ounce	.18	@	—

Cotton Exports from Alexandria

Alexandria, April 20, 1923

	Receipts Alexandria Cantars	Exports in Bales to England	Continent	America	Total Exports Cantars	Stock Alexandria Cantars
This week	62,228	6,187	3,005	1,860	83,469	1,790,358
Same week 1922	83,958	5,623	5,544	450	88,481	2,261,160
" " 1921	116,220	5,341	2,251	666	62,611	1,819,519
Since 9/1/1922	6,332,727	345,215	237,870	192,348	5,874,369	—
Same time 1921	4,685,010	248,679	163,294	147,386	4,258,850	—
" " 1920	3,723,582	153,578	109,195	38,361	2,302,265	—

Chemicals and Compounding Ingredients

THE INDUSTRIAL CHEMICAL MARKET—NEW YORK, May 18, 1923—The past two weeks were dull ones in the industrial chemical market and little of real interest came to light. Buyers were not disposed to buy at present levels beyond their immediate requirements and yet, as producers have had to meet all sorts of increased production costs, there does not seem to be any reasonable hope that there will be much lower prices on any of the important domestic chemicals. A very encouraging feature that points to more activity in the near future is the fact that contract withdrawals, which have been good for some time, continue good in spite of the present dullness in spot trading.

ACCELERATORS

Organic			
Aldehyde ammonia, crystals	lb.	$ .90 @	.95
Aniline oil, drums	lb.	.16½ @	.17
Diphenylguanidine	lb.	1.20 @	—
Excellerex,	ton	17.00 @	—
Formaldehyde-Aniline	lb.	.50 @	.52
Hexamethylene-tetramine	lb.	.90 @	.95
Paraphenylenediamine	lb.	1.55 @	1.60
Thiocarbanilide, kegs	lb.	.27 @	.30
Vulcocene	lb.	.35 @	—
Inorganic			
Lead, sublimed blue	lb.	.09¼ @	—
Lead, white	lb.	.09⅛ @	—
Litharge, domestic	lb.	10.90 @	11.74
imported	lb.	.17 @	—
Lime, Superfine	lb.	.02 @	.02½
Magnesia, calcined, light,	lb.	.23 @	.24
extra light	lb.	.45 @	—
heavy	lb.	.05 @	.06
Orange Mineral	lb.	14.40 @	14.50

COLORS

Blacks			
Carbon Black	lb.	.20 @	.25
Micronex		— @	—
Lamp Black	lb.	.12 @	.40
Bone "	lb.	.05½ @	.07½
Drop "	lb.	.07½ @	.10
Ivory "	lb.	.15 @	.45
Blues			
Prussian	lb.	.55 @	.60
Ultramarine	lb.	.18 @	.35
Cobalt	lb.	.21 @	.26
Browns			
Iron oxide	lb.	.03¾ @	.06
Sienna, Italian,	lb.	.06 @	.08¾
Umber, Turkey,	lb.	.04 @	—
Vandyke, domestic	lb.	.03½ @	.04
Greens			
Chrome, light	lb.	.32 @	.34
medium	lb.	.35 @	.36
dark	lb.	.36 @	.45
commercial	lb.	.12 @	—
Reds			
Antimony crimson, 15/17% F.S.	lb.	.34 @	.44
sulphur free	lb.	.39 @	.50
golden, 15/17% F.S.	lb.	.32 @	—
calcium and sulphur free		.40 @	—
red sulphuret 15/17% F.S.	lb.	.19½ @	—
Indian, English,	lb.	.12 @	.15
Para toner	cwt.	1.00 @	1.10
Toluidine toner	lb.	2.10 @	2.25
Venetian red	lb.	.03½ @	.06
Vermillion, quicksilver, English	lb.	1.20 @	—
domestic	lb.	.25 @	.30
Whites			
Albalith	lb.	.07 @	.07½
Aluminum bronze	lb.	.55 @	.60
Azolith	lb.	.07 @	.07½
Lithopone, domestic (factory)	lb.	.07 @	.07½
Zinc Oxide—American Process			
American Horse Head special	lb.	.08½ @	.09
XX red	lb.	.08 @	.08½
American Azo: ZZZ (lead free)	lb.	.08 @	.08½
ZZ (under 5 per cent leaded)	lb.	.07¼ @	.07¾
Z (8-10 per cent leaded)	lb.	.07¼ @	.07¾
Zinc Oxide—French Process			
White seal	lb.	.12 @	.12¼
Green seal	lb.	.10¾ @	.11¼
Red seal	lb.	.09¾ @	.10¼
Yellows			
Chrome, light		.20 @	.21
dark and medium	lb.	.20 @	.21
Cadmium Sulphide	lb.	1.50 @	1.75
Ocher, French	lb.	.02¾ @	.03½
domestic	lb.	.02½ @	.03

COMPOUNDING INGREDIENTS

Aluminum flake	ton	25.00 @	30.00
hydrate	lb.	.19 @	.21
Ammonia carbonate,	lb.	.07¾ @	.10½
Barium carbonate,	ton	75.00 @	80.00
Barium Dust	lb.	.05 @	—
Barytes southern off-color,	ton	15.00 @	20.00
Western, prime white	ton	28.00 @	—
Basofor	lb.	.04¾ @	—
Blanc fixe, dry f.o.b. works	lb.	.04 @	.04¼
Carrara filler	lb.	.01½ @	.02
Chalk, precipitated, extra light	lb.	.04¼ @	.05
heavy	lb.	.03¼ @	.04
Clay, China, domestic,	ton	15.00 @	16.50
imported	ton	16.25 @	23.25
Dixie	ton	22.00 @	32.00
Blue Ridge	ton	20.00 @	30.00
Fossil flour	ton	60.00 @	—
Glues, extra white	lb.	.30 @	.40
medium white	lb.	.20 @	.26
cabinet	lb.	.18 @	.30
cabinet low grade	lb.	.16 @	.19
common bone	lb.	.08½ @	.14
Graphite flake, bbls.	lb.	.05 @	.06
amorphous	lb.	.05 @	—
Infusorial earth, powdered	ton	60.00 @	—
b-lted	ton	65.00 @	—
Liquid latex	gal.	1.30 @	—
Mica, powdered	lb.	.15 @	—
Rotton Stone (powdered)	lb.	.02½ @	.04½
Silica (gold bond)	ton	31.00 @	—
Soapstone, powdered	ton	12.00 @	15.00
Starch, powdered	cwt.	2.80 @	2.90
Talc, domestic	ton	15.00 @	18.00
French	ton	20.00 @	—
French, high grade	ton	40.00 @	—
Italian	ton	47.00 @	58.00
Terra Alba	cwt.	1.85 @	2.00
Tripoli, white	lb.	.02 @	.02½
Whiting, commercial	cwt.	1.00 @	1.25
Quaker	ton	13.00 @	15.00
English, cliffstone	cwt.	1.50 @	2.00
gilder's bolted	cwt.	1.10 @	1.25
Paris white American	cwt.	1.25 @	1.50
Wood pulp XXX	ton	35.00 @	—
" " X	ton	25.00 @	—
Zinc Oxide— 5 per cent leaded		.07¼ @	.07¾
10 per cent lead sulphate	lb.	.07¼ @	.07¾
20 per cent lead sulphate	lb.	.07¼ @	.07¾
35 per cent lead sulphate	lb.	.07¼ @	.07¾

(Also see whites)

MINERAL RUBBER

Gilsonite	ton	65.00 @	—
Genasco (factory)	ton	60.00 @	—
Hard hydrocarbon	ton	33.00 @	42.00
Soft hydrocarbon	ton	32.50 @	38.00
Pioneer M.R.	ton	42.00 @	44.00
320/340 M. P. hydrocarbon (c. l. factory)	ton	45.00 @	50.00
300/310 M. P. hydrocarbon (c.l. factory)	ton	40.00 @	45.00
Syntpro, granulated, M. R. (factory)	ton	55.00 @	65.00

SOFTENERS

Acids			
Acetic, 28 per cent	cwt.	3.38 @	3.63
Cresylic, 97 p.c.	gal.	1.25 @	1.30
95 p. c.	lb.	1.20 @	1.25
Muriatic, 20 degrees	cwt.	1.00 @	1.10
Nitric, 36 degrees	cwt.	4.50 @	5.00
Sulphuric, 60 degrees	ton	9.50 @	12.00
66 degrees	ton	15.00 @	16.00
Tartaric, crystals	lb.	.37¼ @	—
Alkalies			
Caustic soda, 76 p.c.	cwt.	3.26 @	3.75
Soda ash, 58 p.c.	cwt.	1.95 @	2.30
Oils			
Castor, No. 3, bbls.	lb.	.14 @	—
Corn, crude, bbls.	lb.	.12½ @	—
refined	lb.	.13¼ @	—
Chinawood, bbls.	lb.	.25 @	.37
Cottonseed,		.09¾ @	.12½
Glycerine, drums	lb.	18½ @	.19
Linseed, domestic	gal.	1.09 @	1.14
imported	gal.	1.10 @	1.15
Palm Niger		.07¼ @	.08
Lagos	lb.	.08¼ @	.08½
Peanut,domestic,crude	lb.	.15½ @	.16
Pine, steam distilled	gal.	.75 @	.80
Rapeseed, refined	gal.	.85 @	.88
blown	gal.	1.00 @	1.05
Rosin, first rectified	gal.	.46 @	—
second rectified	gal.	.48 @	—
Tar, commercial	gal.	.31½ @	—
Soya Bean		.11½ @	.13¼
Petrolatum, standard	lb.	.05 @	.08
dark amber	lb.	.03½ @	—
Resins and Pitches			
Cumar resin, hard	lb.	.09 @	.10
soft		.09 @	.10
Tar Retort	bbl.	12.50 @	—
kiln burned	bbl.	13.50 @	—
Pitch, Burgundy	lb.	.05 @	.06
coal tar	lb.	.01½ @	—
pine tar	lb.	.03 @	—
Rosin, grade K	bbl.	6.15 @	—
Shellac, fine orange	lb.	.90 @	—
Solvents			
Acetone, drums	lb.	.21 @	—
Alcohol, denatured, No. 1 bbls.	gal.	.43 @	.45
Benzol, 90 per cent	gal.	.27 @	.33
pure	gal.	.30 @	.35
Carbon bisulphide,	lb.	.06 @	.06¾
Tetrachloride	lb.	.09 @	.10½
Dimethylaniline	lb.	.42 @	.43
Motor gasoline, steel bbls.	gal.	.22½ @	—
Naptha, V. M. & P.	gal.	.21½ @	—
Toluol, pure	gal.	.30 @	.35
Turpentine, spirits	gal.	1.39 @	—
wood	gal.	1.28 @	—
Waxes			
Beeswax	lb.	.30 @	.45
Carnauba, No. 1	lb.	.42 @	.43
Ceresin, white	lb.	.10 @	.11
Bayberry	lb.	.25 @	.28
Montan, crude	lb.	.04½ @	.05
Ozokerite, black	lb.	.23 @	.24
green	lb.	.27 @	.28
Paraffine	lb.	.03 @	.04
Sweet wax	lb.	.10 @	.12

SUBSTITUTES

Black	lb.	.09 @	.13
White	lb.	.09½ @	.16
Brown	lb.	.09 @	.15
Brown factice	lb.	.10 @	.16
White factice	lb.	.10 @	.16

VULCANIZING INGREDIENTS

Black hyposulphite	lb.	.19 @	—
Sulphur chloride (jugs)	lb.	.13½ @	.15
" " (drums)	lb.	.08 @	.10
Sulphur flour (bbls.)	cwt.	2.75 @	3.30
(bags)	cwt.	2.50 @	3.05
Sulphur, 100 per cent pure,		— @	—
Bergenp't brand (bags)	cwt.	2.45 @	2.80
(bbls.)	cwt.	2.70 @	3.05

Chemical Notes

Lithopone — Production continues at capacity and even then there is difficulty in supplying the demand. Makers have enough business booked ahead to keep them busy for months to come. Domestic is quoted at 7 cents a pound for bags, 7 to 7¼ cents for barrels, carlots and 7¼ to 7½ cents, less than carlots.

Litharge—Makers are doing a record business and their only concern is to supply the demand. Prices remained unchanged, casks bringing 10.90 cents a pound; 100 to 500 pound kegs, 14.50 cents; 500 to 2,000 pounds, 13.05 cents; 2,000 to 10,000 pounds, 12.52 cents; carlots, minimum 15 tons, 11.74 cents.

Blanc Fixe — Consumption of blanc fixe continues very heavy and some leading makers have difficulty in keeping up deliveries. Dry continues to be quoted at 4 to 4½ cents a pound and pulp at $50 to $55 a ton.

Orange Mineral—A quiet market prevailed with prices firm and unchanged. Domestic material is quoted at 14.40 to 15.50 cents a pound; French at 17 cents and English at 15.50 cents.

Whiting—There was no change in the price of whiting but the demand from the rubber trade was very heavy and the call for deliveries on contract would indicate that there is little surplus stock held by the consumers. Commercial continued at $1.00 per hundred pounds; American paris white, $1.15; English cliffstone, $1.50.

Zinc Oxide—Producers are well satisfied with the demand for this material and the tone of the market is very strong. In spite of the same cost of production 35 per cent leaded continues to be sold by some makers one-quarter cent a pound lower than 5 per cent leaded. Consumption of French process is very heavy and red seal in bags is quoted at 9¾ cents a pound; barrels, carlots, 10 cents; less than carlots, 10¼ cents; white seal, barrels, carlots, 12 cents; less than carlots, 12½ cents; green seal, bags, 10¾ cents; barrels, carlots, 11 cents; less than carlots, 11¼ cents.

Reclaimed Rubber

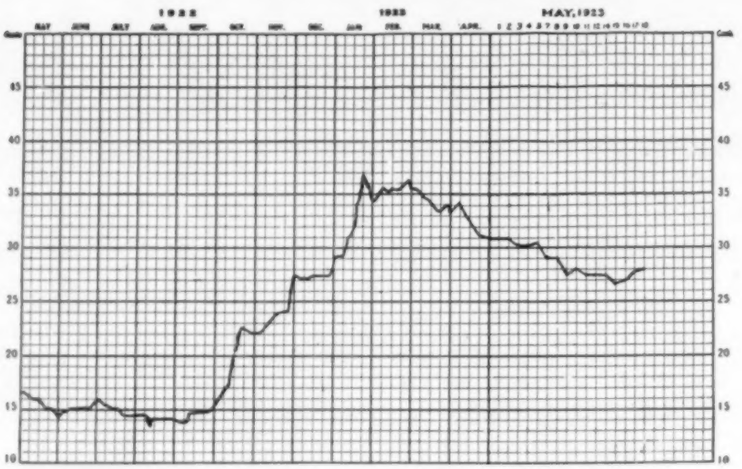
NEW YORK, May 17, 1923

Although quotations for both crude and scrap rubber were lower, prices of reclaimed remained steady throughout the past two weeks. There was practically no change in prices quoted, this fact being the result of labor costs. Factories are still operating at capacity, and manufacturers state that they still have considerable quantities of scrap on hand.

Quotations of this date are as follows:

Standard Reclaims			
Floating Tube	.17	@	.18
Friction	.24	@	.25
Boots and Shoes	.11½	@	.12
Boots and Shoes (washed)	.13¾	@	.14¼
Mechanical	.10	@	.11
Hose	.10	@	.11
Tires, truck	.09	@	.09½
Tires, auto	.10	@	.10½
White	.13⅛	@	.14

Spot Prices Ribbed Smoked Sheets at New York



Copyright 1923, F. R. Henderson Co.

Scrap Rubber

NEW YORK, May 17, 1923

In the opinion of dealers here the scrap rubber market has reached its lowest levels. They point to the fact that the reclaiming factories are operating at practically plant capacity. This is a good sign, dealers claim, and considerable improvement in the prices of scrap rubber is anticipated.

During the past fortnight, however, prices have eased off fractionally. In spite of this downward trend there were a number of inquiries from manufacturers. In the opinion of dealers manufacturers' stocks of scrap rubber are rapidly being reduced, and an upswing in prices is expected to commence about July 1.

Boots and shoes were off a quarter of a point, quoted 0.02½ @ 0.02¾ cents a pound while small quantities of inner tubes No. 1 were sold at prices ranging between 0.04¼ to 0.04½ cents a pound. Standard white and mixed auto remained firm throughout, quoted 20 @ 25 and 11 @ 12 dollars a ton.

Prices quoted at this date are:

Auto tire peelings	.01	@	.01¼
Standard White auto ....ton	20.00	@	25.00
Mixed auto .....ton	11.00	@	12.00
Bicycle tires .....ton	7.00	@	8.00
Clean solid truck tires	.01¼	@	.01½
Boots and shoes	.02½	@	.02¾
Arctics, trimmed	.01¾	@	.02
Arctics, untrimmed	.01⅛	@	.01⅝
Inner tubes, No. 1	.04¼	@	.04½
Inner tubes, compounded	.03¼	@	.03½
Inner tubes, red	.02¾	@	.03
Battery jars, clean hard rubber	.02	@	.02½
Rubber Hose	.00¾	@	.00⅞
Red packing	.01	@	.01¼
White druggist sundries	.04	@	—

Crude Rubber

NEW YORK, May 17, 1923

Although there have been a large number of inquiries by manufacturers for crude rubber, their bids have been below present market levels. As a result the crude rubber market has eased off several points during the past two weeks. Another factor that contributed to the market's present weakness is that heavy arrivals from London exceeded expectations by 30 or 40 per cent. Up to the middle of this month there had already been received about 23,000 tons of crude in this country, thus assuring about 40,000 tons for the month—the largest in a number of years.

While dealers are not optimistic over future developments, they, however, believe that the market will be steadier by June the first. Their assertions are based upon the fact that the British Government is expected to place a heavy penalty upon the smuggling of rubber from English to Dutch possessions. Again, it is rumored that the English Government is to reduce the restriction percentage. For the first quarter of the current year over 80,000 tons of crude rubber have been shipped from London, dealers say, while stocks in Singapore are said to total about 12,000 tons.

In the lower grades prices declined fractionally. At present there is practically no demand for Balata's, Pontianac's, and very little demand for Paras.

Quotations of this date are as follows:

Plantations			
Ribbed Smoked Sheets	.27¼	@	.27½
First Latex, spot	.27¼	@	.27½
May, June	.27¼	@	.27½
July, December	.27½	@	.27¾
Amber Crepe No. 1, spot	.27½	@	.27¾
Amber Crepe No. 2, spot	.26¾	@	.27
Amber Crepe No. 3, spot	.26¼	@	.26¾
Light Clean Thin Brown Crepe	.26¼	@	.26½
Commercially Clean Thin Brown Crepe	.26	@	.26¼
Specky Brown Crepe	.25¾	@	.26
Roll Brown Crepe, spot	.24¾	@	.25
Paras			
Madeira Fine	.28¼	@	.28½
Acre Fine	.26¾	@	.27
Up-river Fine	.26½	@	.26¾
Up-river Medium	.25	@	.25¼
Up-river Caucho Ball (shipment)	.26	@	.26¼
Up-river Coarse	.24¾	@	.25
Islands Fine	.26	@	.26¼
Islands Medium	.24½	@	—
Islands Coarse	.13	@	—
Cameta	.13	@	—
Xingu Ball	.24¼	@	.24½
Tapajos Fine	.26½	@	.26¾
Tapajos Medium	.25	@	—
Pontianac			
Prime Pressed	.13	@	.14
Plantation	.07½	@	—
Bangermassin	.08	@	—
Siak Gutta Percha	.20¾	@	—
Prime Macassar	3.00	@	—
Balata			
Surinam Sheets	.80	@	.85
Columbia Block	.60	@	.65
Venezuela Block	.70	@	.75

American Rubber Patents

GRANTED, MAY 1, 1923

1,453,276 Nonskid Attachment for Vehicle Wheels. Jacob K. Kominz, Rochester, N. Y.

1,453,305 Self-Sealing Petrol Tank or Other Container. Charles Angus Cleghorn, Woburn, Sands, England.

1,453,348 Punctureproof Pneumatic Tire. Robert Grieve and John W. Flading, Lansing, Mich.

1,453,351 Tire. Harry R. Haupt, St. Louis, Mo.

1,453,403 Resilient Heel. Joseph A. Parrella, Washington, D. C.

1,453,459-460 Resilient Heel Lift. Raymond I. Hill, Elyria, Ohio, assignor by mesne assignments to W. R. Huntington.

1,453,485 Repair Plug for Inner Tubes. John R. Bosburgh, Johnstown, N. Y.

1,453,515 Process of Making Vulcanization Accelerators. Paul I. Murrill, Plainfield, N. J., assignor to R. T. Vanderbilt Co. Inc., New York, N. Y.

1,453,530 Pneumatic Tire Attachment. Willis A. Shuey, Boise, Idaho.

1,453,614 Cushioned Vehicle Wheel. Rudolph J. Balazs, and Herbert S. Autrex, Cleveland Ohio, assignors to Houston Pneumatic Puncture Proof Wheel Co., Houston, Tex.

1,453,633 Demountable Tire Rim. Clement S. Martin, Rockville, Md.

1,453,721 Tire Valve. Albert B. Norwalk, New York, N. Y., assignor of one-half to Conrad Hubert, White Plains, New York.

1,453,763 Tire-Making Machine. John M. Mylroie, Akron, Ohio, assignor to the Goodyear Tire & Rubber Co., Akron, Ohio.

1,453,786 Resilient Wheel. Georges Arthur Dufresne, Trois Rivieres, Quebec, Canada.

1,453,804. Resilient Vehicle Tire. John E. Mote, Dayton, Ohio.

1,453,823 Hose Construction. Cassius M. Clay Baird, Chicago, Ill.

1,453,852 Tubing Machine. Jeremiah L. Mahoney, New Haven, Conn., assignor to Goodyear's India Rubber Glove Mfg. Co., A Corporation of Connecticut.

1,453,865 Method of Constructing Pneumatic Tires. Frederick S. Dickinson, New York, N. Y., and John Springer, Atlantic Highlands, N. Y., assignors to said Dickinson.

1,453,884 Tire Filler. Van O. Moutray, Muskogee, Okla.

1,453,889 Tire Vulcanizer. Even J. Rohne, Minneapolis, Minn.

1,453,905 Overshoe for Horses. Mabel Blackman, New York, N. Y., assignor to Arthur S. Joseph, New York, N. Y.

1,453,949 Inner Tube. Henry Claude Privett, Long Beach, Calif., assignor of one-half to Charles R. Privett, Burbank, Calif., three-sixteenths to Helen E. Privett, and one-sixteenth to Hollis F. Privett, both of Long Beach, Calif.

1,454,036 Resilient Tire Construction. Samuel C. B. Brown, Amite, La.

GRANTED, MAY 8, 1923

1,454,054 Antiskid Device for Tires. Irwin F. Kepler, Akron, Ohio, assignor to The B. F. Goodrich Co., New York. N. Y.

1,454,074 Pneumatic Tube and Method of Making the Same. Winfield P. Porter, New York, N. Y.

1,454,103 Solid Tire for Wheels. Valentin Marti Carretosa, Barcelona, Spain.

1,454,109 Nonslip Guard for Automobile Tires. Giles A. Doty, Davenport, Iowa.

1,454,395 Tire Heater. William A. Maas and Thomas J. Maas, Waterford, Wis.

1,454,320 Tire Tool. Thomas Bracey Jenkins, Richmond, Ind., assignor to Jenkins Vulcan Spring Co., Richmond, Ind.

1,454,342 Resilient Wheel. William H. Smith, Bridgeport, Conn.

1,454,469 Pneumatic Tire. Frederick S. Dickinson, New York, N. Y., and John Springer, Atlantic Highlands, N. J.; said Springer assignor to said Dickinson.

1,454,627 Rim Handling Device. David A. Davies, Cleveland, Ohio, assignor to Weaver Manufacturing Co., Springfield, Ill.

1,454,645 Breathing Apparatus. Frederick W. Koehler, Pittsburgh, Pa., assignor to American Atmos Corp., Pitsburgh, Pa., a Corporation of New York.

1,454,655 Mold for Forming Repair Patches. James Robertson, Jr., Weehawken, N. J.

1,454,687 Method of Making acidproof Containers. Joseph E. Perrault, Watertown, Mass., assignor to Hood Rubber Co., Watertown, Mass.

1,454,797 Tire Rim. Joseph H. Taylor, Mellen, Wis.

1,454,829 Spring Rim. Thomas H. Bell, New York and John G. Schoenleber, Brooklyn, N. Y.

New Incorporations

ALABAMA

Tire Service Co. $25,000. E. B. Heiser, president; W. B. Phillips, vice president; J. E. Walters. Principal office, Birmingham, Alabama.

DELAWARE

American Cushion Tire Corporation. $1,000,000. Agent, United States Corporation Co.

Fuhr-Barnes Manufacturing Co., to manufacture rubber products. $530,000. Incorporators: T. L. Croteau, M. A. Bruce, and A. M. Hooven —Wilmington, Deleware. Agent, Capital Trust Company of Delaware, Dover, Delaware.

Subers Rubber Co., to deal in rubber products. $100,000. Principal office, Scottdale, Pennsylvania.

NEW JERSEY

Braender Rubber & Tire Co., to manufacture rubber products. $265,000. Principal office, Wallington, New Jersey. Incorporators: David Z. Jeselsohn, Regina E. Donahue—Newark, N. J.; Benjamin F. Teitelbaum—Jersey City.

NEW YORK

Royal Rubber Waste Co., to deal in scrap rubber. $10,000. Incorporators: S. Jaffe, M. Hirsch, I. H. Betchley. Attorney, S. N. Haberman, 320 Broadway, New York City.

Gove & Weber, to deal in rubber. $15,000. Incorporators: C. Norris, W. L. Bryant, G. Botts. Attorneys, Williamson & Bayles, 115 Broadway, New York City.

Evernu Rubber Heel Sales Co.. $12,000. Incorporators: S. Wedeen, I. Esmonde, D. Bransilver. Attorneys, Epstein & Brothers, 2 Rector street.

Gladstone Tyre C Rubber Co., Inc., to manufacture rubber products. $1,000. A. Gladstone, W. H. Gladstone and H. D. Gladstone—411 West 51st street, New York City.

Metropolitan Mileage Corporation, to manufacture tires. $500,000. Incorporators: R. Edelstein, 40 West 45th Street; H. C. Neuwirth, 2030 Broadway; N. Spivack, 66 East 11th street —New York City.

Laurence P. Regan, Inc., to manufacture tires. $3,500. Incorporators: L. P. Regan, 50 North 22nd street, Flushing, Long Island, New York; E. V. Walter, 410 West 41st street, New York City.

Hexagon Tire Co., Inc., to deal in tires. $500. E. Baumgarten, 1153 First avenue; J. F. Crowley, 527 West 23rd street, and I. E. Foley, 620 West 116th street—New York City.

Royal Rubber Waste Co., to deal in scrap rubber. $10,000. Incorporators: S. Jaffe, M. Hirsch and I. H. Betchley. Attorney, S. N. Haberman, 320 Broadway.

OHIO

Weatherproof Garment Co., to manufacture rubberized materials. $60,000. Principal office, Reignaway Building, Galion, Ohio. Incorporators: G. G. Hornstein, president; R. O. Morgan, vice president; J. E. Casey, secretary; J. Rose, general manager and treasurer.

Moes Tire Co., to deal in tires. $4,000. Principal office, Cleveland, Ohio. Incorporators: M. A. Salzman, H. J. Alferin, E. M. Mack and H. K. Spero.

Northern Rubber Co., to manufacture rubber products. $250,000. Principal office, Akron, Ohio. Incorporators: L. W. Schott, R. W. Kent, A. I. Wheeler and P. A. Kuhn.

Painesville Rubber Company. $10,000. Principal office, Painesville, Ohio. Incorporators: E. Hill, J. Kleinman, H. R. Skola, T. L. Sullivan and Morton S. Pollock.

WISCONSIN

Gordon B. Reese, Inc., to deal in tires and tubes. $25,000. Principal office, Milwaukee, Wisconsin. Incorporators: J. S. Auer, E. A. Reese and G. B. Reese.

Wisconsin-McWade Rubber Co. $10,000. Principal office, Milwaukee, Wisconsin.

Trade Marks

[The following are trade-mark applications pertinent to our field pending in the United States Patent Office which have been passed for publication and are in line for early registration unless opposition is filed promptly. For further information address National Trade-Mark Company, Barrister Building, Washington, D. C., trade-mark specialists. As an additional service feature to its readers this Journal gladly offers to them an advance search free of charge on any mark they may contemplate adopting or registering.]

NORGLID MERIT, MERIT — No. 121,766. Stanley Glidden Co. Inc., Boston, Mass. For pneumatic and solid rubber tires, tubes, patches, rubber gaskets, etc.

Two tires encompassing globe with map of North America within, across which words Wichita, Kansas appear—No. 118,089. Mid-Continent Tire Manufacturing Co., Wichita, Kansas. Rubber tires and inner tubes.

SPENWOOD—No. 151,299. George Spencer, Moulton & Co., Ltd., Westminster, London, England. India-rubber tires and tubes.

T & K surmounted by conventional crown within a circle—No. 165,168. Type & King, Ltd., Mitcham Common, Surrey, England. For antimony, cadium, sulphides, chrome oxides, hypophosphates of lime, soda, potash, magnesium, manganese, iron and ammonia.

GEM—No. 172,512. Gem Tire and Rubber Co., Philadelphia, Pa. Tires and inner tubes.

MALATEX, elliptically shaped—No. 172,533. F. R. Henderson & Co., New York City. For caoutchouc milk.

PREMIER, within octagon—No. 173,186. The Fisk Rubber Co., Chicopee Falls, Mass. Rubber tires.

Narrow circumferential brown (chocolate-colored) stripes covering portions of side walls of tires and space from the tread and edge portions thereof—No. 166,223. Empire Tire & Rubber Corporation, Trenton, N. J. Pneumatic vehicle tires.

STAG—No. 171,751. The Columbia Tire and Rubber Co., Mansfield, Ohio. Pneumatic cord and fabric tires.

ADDSMILES—No. 173,306. A. J. Stephens Rubber Co., Kansas City, Mo.. Outer tires or covering for pneumatic tire casings.

Shaded or cross-hatched square with yellow color with word WEAR in large U.—No. 176,338. Goodyear Rubber Co., Middletown, Conn. For rubber boots and shoes and artic overshoes.

DURO—No. 174,427. Continental Rubber Co., New York City. For washed and dried unvulcanized rubber.

RELLIM in old English type—No. 174,791. Miller Rubber Co., Akron, Ohio. For solid and pneumatic rubber and fabric tires.

KALISTA—No. 176,069. Godfrey L. Cabot, Inc., Boston, Mass. For carbon black.

CIM—No. 176,070. Godfrey L. Cabot, Inc., Boston, Mass. For carbon black.

AUK—No. 176,067. Godfrey L. Cabot, Inc., Boston, Mass. For carbon black.

DAR—No. 176,071. Godfrey L. Cabot, Inc., Boston, Mass. For carbon black.

TOURISTS PRIDE—No. 132,601. Tourists Pride Mfg. Co., Minneapolis, Minn. For inner tube repair patches.

ROADSTER—No. 155,968. The National Tire & Rubber Co., East Palestine, Ohio. Vehicles tires of rubber and fabric, inner tubes, casings and shoes.

PROTECTURSUIT—No. 164,185. The Oberndorfer Co., Milwaukee, Wis. Rubber aprons.

KLAWGRIP—No. 169,339. Giles Valiquette, Montreal, Quebec, Canada. For rubber treads.

BAFFO—No. 170,880. John E. Gleason, Asbury Park, N. J. Gaskets for internal-Combustion Engines.

MURDOCK'S "PLAZMAT" VULCANIZING PAD—No. 171,811. Murdock Vulcanizing Co., Montrose, Colo. Plaster in powdered form for use in forming a vulcanizing pad.

CORDATIC—No. 172,332. Hungarian Rubber Goods Factory, Limited, Budapest, Hungary. Rubber tires for cycles, motor cars and other vehicles.

NINETY-SIX—No. 172,416. The Fisk Rubber Co., Chicopee Falls, Mass. Rubber Tires.

ZOFLI—173.972. Martins Birmingham, Limited, Birmingham, England. Golf balls and footballs.

ZENITH RAY—No. 174,534. Zenith Golf Ball Works, New York City. Golf balls.

ZENITH ORB—No. 174,537. Zenith Golf Ball Works, N. Y. City. Golf balls.

STAR BRAND—No. 175,332. Beaman & Parrott, Knoxville, Tenn. Rubber heels for shoes.

LAGONDA—No. 142,802. The National Tire & Rubber Co., East Palestine, Ohio. Tires and tubes.

TWO RINGS of one or more beads or the like, each concentric with the inner and outer periphery of the side walls of the tire and serving to frame the usual lettering on said side wall—No. 167,712. The Cord Tire Corporation, Chester, W. Va. Pneumatic tires.

TETRALIN—No. 142,044. Tetralin Gesellschaft Mit Beschranken Haftung, Berlin, Germany. Rubber mats, waterproofed and rubberized fabrics, slabs of rubber composition for use in making shoe soles. Waterproofed coverings for persons, animals and vehicles.

THE GOODYEAR NEWS—No. 157,566. The Goodyear Tire and Rubber Co., Akron, Ohio. House organ.

TRU FLYTE—No. 171,503. Irving B. Levy, New York City. Golf Balls.

MAGIC—No. 172,584. Cupples Company, Manufacturers, St. Louis, Mo. Rubber jar rings.

ELI—No. 173,629. The Eli Boot Shop Co., New Haven, Conn. Boots and shoes of leather and rubber.

STATISTICS

IMPORT **PRODUCTION** **EXPORT**

CONSUMPTION AND SALES FIGURES FOR FIRST QUARTER

The data presented below, gathered by the Rubber Association's Questionnaire for 1923—First Quarter, presents information concerning the production of reclaimed rubber and the consumption of scrap rubber involved thereby; crude rubber consumption; sales value of finished products; the crude rubber inventory and the amount afloat for importers, dealers and manufacturers as of March 31, 1923.

It is believed that the data therein contained represents approximately 90 per cent of the entire rubber industry in the United States.

Danes Increase Duty on Tires

The Danish import duty on automobile tires and tubes has been increased, effective May 1, according to a cablegram, dated May 2, received from assistant Trade Commissioner Harry Sorensen at Copenhagen. The new rate of duty on casings and tubes is as follows.

Automobile tires and tubes —0.40 Krone per net kilo, plus 6 per cent of the invoice value. The par value of the Krone is $0.268, while the kilo is 2.2046 pounds avoirdupois.

English Going to Bahia

About 1,000,000 acres of land is said to have been purchased by British interest in the State of Bahia, Brazil. English families will locate there with the intentions of cultivating rubber, cacao, cotton and other products. A party of experts are said to have left England for the purpose of investigating conditions in Bahia and to make arrangements for the settlers, expected there before April, 1924.

Statistics Compiled from 1923 Questionnaire—First Quarter

COVERING THE FIRST THREE MONTHS OF 1923

Number of rubber manufacturers reporting data 269
Number of crude rubber importers and dealers reporting data 38
Number of reclaimers (solely) reporting data 7

TOTAL DAILY AVERAGE NUMBER OF EMPLOYEES
(On Basis of Third Week of January, 1923)
159,981

	Reported by Mfrs. who also reclaim (25)	Reported by Reclaimers solely (7)	Total
Number of Pounds Reclaimed Rubber Produced from Raw and Cured Scrap	14,546,664	28,389,193	42,935,857
No. of Pounds Scap Rubber (including Raw and Cured Scrap) Consumed in production of Reclaimed Rubber	20,072,231	29,618,044	49,690,275

Number of Pounds of Crude Rubber Consumed in the Manufacture of Rubber Products and Total Sales Value of Shipments of Manufactured Rubber Products

PRODUCT	Number of Pounds of Crude Rubber Used	Total Sales Value of Shipments of Manufactured Rubber Products
Tires and Tire Sundries:		
Automobile and motor truck pneumatic casings	115,667,104	$126,329,859
Automobile and motor truck pneumatic tubes	28,006,584	17,307,910
Motorcycle tires (casings and tubes)	271,151	410,194
Bicycle tires (single tubes, casings and tubes)	915,762	1,134,068
All other pneumatic casings and tubes, not elsewhere specified	16,240	11,797
Solid tires for motor vehicles	15,732,589	9,181,624
All other solid tires	200,947	170,868
Tire sundries and repair materials	1,149,668	2,361,906
TOTAL—Tires and Tire Sundries	161,959,045	$156,908,226
Other Rubber Products:		
Mechanical rubber goods	11,596,086	24,192,552
Boots and shoes	8,277,291	24,848,853
Insulated wire and insulating compounds	1,918,081	7,479,104
Druggist sundries, medical and surgical rubber goods	1,358,603	2,916,853
Waterproof cloth, clothing, and rubber sheeting	2,124,846	5,745,145
Hard rubber goods	1,959,252	2,990,369
Heels and soles	3,511,205	4,819,291
Miscellaneous, not included in any of above items	2,393,433	5,759,956
TOTAL—Other Rubber Products	33,138,797	78,752,123
GRAND TOTAL—ALL PRODUCTS	195,097,842	$235,660,349

Inventory of Crude Rubber in the United States and Afloat for U. S. Ports, March 31, 1923

ON HAND	Long Tons: Plantation	Para	All Other	AFLOAT	Long Tons: Plantation	Para	All Other
Manufacturers	60,187	4,209	1,203	Manufacturers	15,680	178	22
Importers and Dealers	14,933	1,600	203	Importers and Dealers	28,733	303	177
Total	75,120	5,809	1,406	Total	44,413	481	199

GRAND TOTAL—ON HAND, 82,335 GRAND TOTAL—AFLOAT, 45,093

Copyright 1923, The Rubber Association of America, Inc.

Summary of Rubber Exports for March, 1923

Compiled by the Department of Commerce

RUBBER BELTING, HOSE, PACKING, AND THREAD.

	Rubber Belting: Pounds	Rubber Belting: Dollars	Rubber Hose: Pounds	Rubber Hose: Dollars	Rubber Packing: Pounds	Rubber Packing: Dollars	Rubber Thread: Pounds	Rubber Thread: Dollars
Total	333,497	168,411	367,846	181,259	115,327	59,934	79,788	81,837

PNEUMATIC CASINGS AND SOLID TIRES

	Pneumatic Casings: For automobiles: Number	For automobiles: Dollars	Other: Number	Other: Dollars	Solid Tires: For Automobiles and Motor Trucks: Number	For Automobiles and Motor Trucks: Dollars	Other: Pounds	Other: Dollars
Total	190,468	2,017,424	8,881	35,899	10,576	257,251	180,078	38,958

RUBBER FOOTWEAR AND SOLES AND HEELS.

	Boots: Pairs	Boots: Dollars	Shoes: Pairs	Shoes: Dollars	Canvas shoes with rubber soles: Pairs	Canvas shoes with rubber soles: Dollars	Rubber soles and heels: Pounds	Rubber soles and heels: Dollars
Total	20,990	62,419	57,942	47,675	598,928	449,472	199,000	68,800

HARD RUBBER GOODS AND DRUGGISTS' RUBBER SUNDRIES.

	Druggists' Rubber Sundries: Pounds	Druggists' Rubber Sundries: Dollars	Battery jars and Accessories: Pounds	Battery jars and Accessories: Dollars	Other Electrical Supplies: Pounds	Other Electrical Supplies: Dollars	Other hard rubber goods: Pounds	Other hard rubber goods: Dollars
Total	85,896	75,611	29,544	10,227	110,636	23,983	42,435	34,811

COATED OR WATERPROOFED FABRICS.

	Oilcloth (not floors): Sq. yards	Oilcloth (not floors): Dollars	Coated or Artificial Leather: Sq. yards	Coated or Artificial Leather: Dollars	Waterproofed Autocloth: Sq. yards	Waterproofed Autocloth: Dollars	Waterproofed Clothing: Sq. yards	Waterproofed Clothing: Dollars
Total	1,153,562	295,194	433,103	246,176	129,408	80,256	117,610	107,983

PNEUMATIC TUBES, REPAIR MATERIAL, MANUFACTURES OF RUBBER NOT ELSEWHERE SPECIFIED

	Pneumatic Tubes: Automobiles: Number	Automobiles: Dollars	Other: Number	Other: Dollars	Tire Repair Material: Pounds	Tire Repair Material: Dollars	Rubber Manufactures (n.e.s.): Pounds	Rubber Manufactures (n.e.s.): Dollars
Total	134,141	221,429	9,389	7,347	77,309	33,988	549,297	323,364

New Schedule for Maximum Tire Capacities

These new figures are being given wide publicity through the medium of a twenty-four page pamphlet entitled, "The Care of Tires", which is to be published shortly by the Rubber Association for distribution to car-owners. The booklet shows not only tires which are injured through unintentional misuse, but as well how to obtain maximum tire service by following a few simple rules. As under-inflation and over-loading are two of the principal causes of tire trouble, the booklet emphasizes the necessity for strict adherence to the recommended minimum and maximum figures presented in the table.

The Executive Committee-Tire Manufacturers Division of the Rubber Association of America has formulated and recommended for adoption as standard by all manufacturers the attached new schedule of maximum load carrying capacities and minimum inflation pressures.

In the table the figures representing the maximum load and minimum inflation which are recommended to the car-user as safe practice are prefixed by an asterisk,(*). Higher load and inflation figures are shown only for the guidance of users who may wish to disregard the recommended limits.

MAXIMUM LOAD CARRYING CAPACITIES (LBS.)

Min. Inflation Pressure (Lbs.)	3″ Fabric	3½″ Fabric	3½″ Cord (Nominal)	3½″ Cord Oversize	4″	4½″	5″	4½″ Truck	5″ Truck	6″	7″	8″	9″	10″	Min. Inflation Pressure (Lbs.)
35	—	375	425	475	—	—	—	—	—	—	—	—	—	—	35
40	300	450	500	550	700	—	—	—	—	—	—	—	—	—	40
45	350	525	575	625	800	950	1200	—	—	—	—	—	—	—	45
50	*400	*600	*650	*700	900	1050	1325	—	—	—	—	—	—	—	50
55	450	675	725	775	*1000	1150	1450	—	—	—	—	—	—	—	55
60	—	—	—	—	1100	*1250	1575	1050	—	—	—	—	—	—	60
65	—	—	—	—	—	1350	*1700	1150	1325	—	—	—	—	—	65
70	—	—	—	—	—	—	1825	*1250	1450	1700	2100	—	—	—	70
75	—	—	—	—	—	—	—	1350	1575	1825	2250	—	—	—	75
80	—	—	—	—	—	—	—	—	*1700	1950	2400	2950	—	—	80
85	—	—	—	—	—	—	—	—	1825	2075	2550	3125	—	—	85
90	—	—	—	—	—	—	—	—	—	*2200	2700	3300	3800	—	90
100	—	—	—	—	—	—	—	—	—	2450	*3000	3650	4200	4650	100
110	—	—	—	—	—	—	—	—	—	—	3300	*4000	4600	5100	110
120	—	—	—	—	—	—	—	—	—	—	—	4350	*5000	5550	120
130	—	—	—	—	—	—	—	—	—	—	—	—	5400	*6000	130
140	—	—	—	—	—	—	—	—	—	—	—	—	—	6450	140

Crude Rubber Imports

Importations of Crude Rubber into the United States During April, 1923

(Estimated net weights—long tons)

PLANTATIONS

FROM	TONS
Batavia	1,928
Belawan-Deli	2,158
Colombo	2,804
Hamburg	57
Japan and Others	134
Liverpool	625
London	5,504
Malacca	1,741
Penang	2,177
Pt. Swettenham	1,050
Rotterdam	562
Singapore	10,964
Sourabaya	218
	29,922

AFRICANS

FROM	TONS
Antwerp	68
Bordeaux	88
Havre	29
Liverpool	198
Marseilles	16
	399

CENTRALS AND GUAYULE

Centrals (Mexico and Central America)	30
Guayule (Mexico) El Paso	25
Guayule (Mexico) Laredo	117
	172

PARAS

Iquitos	8
Manoas	572
Para	515
	1,095

GUMS, WASTE RUBBER, ETC., IMPORTED FROM VARIOUS SOURCES

	Tons
Waste	507
Balata	40
Miscellaneous Gums	1,504

Figures compiled and distributed by The Rubber Association of America, Inc.

Comparison 1922—1923

	APR.-1922	APR.-1923	Total Importations 4 months ending, April 30 1922	1923
Plantations	13,910	29,922	89,665	112,764
Paras	462	1,095	3,176	5,814
Africans	5	399	793	1,998
Central	2	30	35	208
Guayule	65	142	219	142
Manicoba and Matto Grosso	—	—	98	—
	14,444	31,588	93,986	120,921

ARRIVALS PLANTATIONS FOR APRIL, 1923

FROM	ARRIVED AT	TONS
Batavia	New York	1,881
Batavia	Boston	47
Belawan-Deli	New York	2,102
Belawan-Deli	Boston	56
Colombo	New York	2,804
Hamburg	New York	57
Japan and Others	New York	80
Japan and Others	San Francisco	31
Japan and Others	Vancouver	23
Liverpool	New York	625
London	Boston	12
London	New York	5,492
Malacca	New York	1,741
Penang	Boston	9
Penang	New York	2,168
Port Swettenham	New York	1,023
Port Swettenham	Boston	27
Rotterdam	New York	562
Singapore	Baltimore	202
Singapore	Boston	476
Singapore	New York	8,421
Singapore	San Francisco	766
Singapore	Los Angeles	1,099
Sourabaya	New York	199
Sourabaya	Boston	19
		29,922

ARRIVALS OF PLANTATIONS BY PORTS

Atlantic Ports		
New York	27,155	
Baltimore	202	
Boston	646	
		28,003
Pacific Ports		
Vancouver	23	
San Francisco	797	
Los Angeles	1,099	
		1,919
		29,922

CABARRUS COTTON MILLS

M. L. CANNON, President & Treasurer

KANNAPOLIS, N. C.

Superior Quality Tire Fabrics

EGYPTIAN-PEELER
KARDED & COMBED
CORD & SQUARE WOVEN

CANNON MILLS, Inc.

Selling Agents

NEW YORK
55 Worth St.

CHICAGO
327 S. La Salle St.

A. W. REID
Representative